INDISPENSABLE NATION:

US SECURITY GUARANTEES AND NUCLEAR PROLIFERATION

BY

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The undersigned certify that this thesis meets master's-level standards of research, argumentation, and expression.

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ABSTRACT

This essay explores the connection between security guarantees and nuclear proliferation by allies of great powers. I propose a model to explain why U.S. allies pursue nuclear proliferation. I assert that this movement toward nuclear weapons occurs when an ally perceives that the U.S. defense commitment has become insufficient for the threat environment. I test this model using a case study of South Korea's exploration of nuclear weapons in the 1970s. South Korea was facing a severe threat environment when US President Richard Nixon announced that US allies would need to take greater responsibility for their own security. In response, South Korea began to explore a nuclear weapons program. In this context, South Korea's leaders interpreted the United States' attempt at alliance burden-shifting as a sign of abandonment. This perception tilted the threat-commitment balance out of alignment and led to forward movement toward nuclear proliferation. From this case and model, I conclude that US allies take steps advancing nuclear weapons activity when their perception of their threat environment outweighs their perception of US security commitment. From this conclusion, I draw implications about the role of presidential rhetoric and military force posture in assure US allies and discouraging nuclear proliferation.

CONTENTS

Illustrations

Table

Figure

Chapter 1
Introduction

During the 2016 US presidential campaign, then-candidate Donald Trump made comments alluding to his potential reorientation of US foreign policy. He indicated that he was considering reducing the United States' security commitment to US allies around the world. He also expressed an openness to nuclear proliferation by US allies, South Korea and Japan.[1] These two statements together with the "America First" theme of his inauguration speech and his recent canceling of the Trans-Pacific Partnership all indicate a general expectation that Asian allies must do more for their own security. This rhetoric echoes a previous period of US retrenchment in Asia. In 1970, US President Richard Nixon announced that US allies would need to take greater responsibility for their own security. In response, South Korea began to explore a nuclear weapons program. This period of uncertainty and its effects on nuclear proliferation may have lessons for today's policymakers.

Regardless of whether President Trump implements a strategic redirection, it is useful to understand the dynamics that drive nuclear proliferation by a dependent ally. Would a reduction in US commitment to its allies lead to new or resumed nuclear weapons programs? How important are security commitments to containing nuclear proliferation? How does the US credibly signal commitment?

These questions bear directly on a current shift in US public feelings toward foreign policy. The election of Donald Trump on an "America First" platform represents a reaction in public opinion against globalization and the extent of the US role in upholding a liberal

[1] Condon, Stephanie, "Donald Trump: Japan, South Korea might need nuclear weapons," *CBS News,* (29 March 2016), http://www.cbsnews.com/news/donald-trump-japan-south-korea-might-need-nuclear-weapons/

international order. Additionally, mounting US debt and the exponential cost increase in maintaining qualitative military superiority over peer rival have caused many Americans to question the sustainability of US global security guarantees. These trends could augur a looming retrenchment of US defense commitments. It is unknown what the second order effect of such a US withdrawal would have on its allies' decisions regarding nuclear weapons. If one believes that nuclear nonproliferation is in the United States' interest, then it is important to understand how changes in US policy toward its security commitments would affect global nuclear proliferation.

I have written this thesis to bridge the gap between scholars of nuclear proliferation and policymakers who must make decisions about conventional force structure and deployment. In this thesis, I establish a model that synthesizes and simplifies the security-based theories of nuclear proliferation. From this model, one can discern the role of US military force posture in restraining proliferation by allies. This will hopefully assist policymakers and strategists in understanding whether and under what conditions changes in one seemingly distinct area of conventional security policy can have repercussions in the nuclear realm.

The central argument of this thesis is that US allies pursue nuclear weapons when their perception of their threat environment outweighs their perception of US security commitment. I model this argument in terms of a relationship between threat environment and US commitment. I argue that:

$f(P) = T_p - C_p$ or Proliferation = perceived Threat – perceived Commitment

where P is a forward vector along a spectrum of nuclear weapons activities. T_p and C_p are discrete values between 1 and 3 based on criteria for the perceived threat to the US ally and perceived level of commitment

by the United States. To test this model, I will conduct a case study of South Korea's 1970's nuclear weapons policies as responses to a change in the level of US commitment. This period, initiated by President Nixon's Guam Doctrine of reduced US security commitment in Asia, echoes the current environment of potential US retrenchment and may provide insight into potential responses by current US allies.

I have limited the scope of this thesis only to US allies. The model presented here may be generalizable to all great power-protectorate relationships, but it is not the purpose of this thesis to prove that relationship. In addition, this model does not delve below the state level to the domestic/bureaucratic or individual psychological level. My analysis of the nonproliferation research literature leads me to conclude that these individual and domestic level explanations are useful for understanding *how* leaders and organizations translate systemic inputs into policy outputs, but that security factors best explain *why* states initiate or resume nuclear weapons programs.

In Chapter 2 of this thesis, I will review the literature on drivers and restraints of nuclear weapons proliferation. This review will establish the theoretical basis for a security focused explanation of proliferation and will demonstrate the gap in the literature which my model seeks to fill. Overall, nuclear proliferation scholars have found that having a great power ally reduces the likelihood that a state will pursue nuclear weapons. I argue that it is not simply having an ally, but the level of that ally's commitment, demonstrated in military force posture, that matters most. Chapter 3 will then explain and develop a model of US allied proliferation calculation. In this chapter, I will outline a nuclear weapons activity pathway along which a potential proliferant will likely proceed. I will then explain the criteria by which I derive perceived threat and commitment values. I measure threat level using the frequency and duration of militarized interstate disputes and commitment level by formalized treaty and presence of deployed military forces. Chapter 4

tests the model using a case study of South Korea. In Chapter 5, I will conclude with recommended areas for further study and implications for US policy.

Chapter 2

Competing Explanations for Causes of Nuclear Proliferation

The decision to pursue nuclear weapons is one of the most consequential decisions a state can make with dramatic ramifications for its neighbors and the international system. The reasons why an individual state chooses to explore, pursue, acquire, or forego nuclear weapons are manifold, often conflicting, and idiosyncratic. This complexity makes the ability to model, explain, and predict these decisions problematic and has spurred its own proliferation in terms of theoretical diversity. This panoply of proliferation theories also makes developing nonproliferation and security policy challenging as there is no accepted consensus on why states pursue or refrain from nuclear weapons.

The breadth of literature on the causes of nuclear proliferation can be categorized along several lines. First, one can divide explanations for nuclear proliferation into theories based on Supply/Opportunity factors vs Demand/Willingness factors. Second, one could delineate theories of proliferation based on levels of analysis according to Kenneth Waltz's "three images": individual aspects, state level variables, and international systemic influences.[1] A third approach would be to organize competing theories by an international relations theory typology of psychological constructivism, social constructivism/organizational theory, and realist explanations. Although security-based explanations have traditionally dominated the field, normative and liberalist perspectives are increasingly challenging these realist theories.

In this chapter, I review the literature on the causes of nuclear proliferation by first examining technological and supply side

[1] Kenneth N. Waltz, *Man, the State, and War: A Theoretical Analysis*, (Columbia, NY: Columbia University Press, 1954).

explanations. Then I address demand-side, motivational explanations. Because an international relations theory typology aligns well with the level of analysis approach I combine these two categorizations. Finally, I discuss what recent multivariate statistical studies tell us about the relative explanatory power of each of these theories.

This review sets the theoretical basis for model I propose in Chapter 3. From the extensive literature on nuclear proliferation, I conclude that supply-side explanations that emphasize technological provide only a necessary, but insufficient condition. I also conclude that while normative and domestic variables explain *how* states translate nuclear desire into a weaponized reality, security motivations best explain *why* states want nuclear weapons in the first place. This conclusion leads to the security and commitment variables I propose in Chapter 3.

Supply Side Theories of Nuclear Weapons Proliferation

It is intuitive that there are supply side constraints on the opportunity for states to develop nuclear weapons. Nuclear weapons development programs require relatively rare fissile material, a robust and specialized industrial plant, an esoterically skilled scientific community, and a substantial financial investment. While these challenges are not insurmountable, they are formidable. It is because of these challenges that most US and international policy nonproliferation efforts have been in the form of supply-side controls such as the Zannger Committee, the Nuclear Suppliers Group, and the Proliferation Security Initiative.[2] While supply side factors are the most amenable to counterproliferation policy, it is debatable how determinative they are in a state's decision to pursue nuclear weapons. Given the priority states give to security concerns and the potential security benefits a state can

[2] R. Scott Kemp, "The Nonproliferation Emperor Has No Clothes: The Gas Centrifuge, Supply-Side Controls, and the Future of Nuclear Proliferation," *International Security* 38, no. 4 (2014): 42n.

derive from nuclear weapons, it is reasonable that a state may endure great costs to achieve this capability. This is encapsulated in Pakistani Prime Minister Zulfikar Ali Bhutto's famous declaration, "We will make an atomic bomb even if we have to eat grass."[3] Several modern scholars have addressed the relative importance of supply side determinants and whether the capability to produce nuclear weapons increases the likelihood that states will.

Recent debate in the scholarly literature on nuclear proliferation centers on whether the ability to produce a nuclear weapon can actually drives a state's desire to do so. Matthew Kroenig in a 2009 article "Importing the Bomb" argues that states that receive sensitive nuclear assistance, in the form of aid in weapons design, enrichment facility construction, or weapons-grade fissile material, are able leapfrog technical design stages, benefit from tacit scientific knowledge, reduce weapons development costs, and reduce international scrutiny.[4] Kroenig employs statistical analysis to find that all these advantages make states receiving sensitive nuclear assistance 7-12 times more likely to develop nuclear weapons. He concludes that these findings imply that the capability to successfully produce nuclear weapons is not only a necessary condition, but can drive state motivation. "Opportunity can shape willingness. States that could conceivably produce a nuclear-weapons arsenal will face a great temptation to go nuclear."[5] Kroenig's conclusions are based on the assumptions that states view nuclear weapons as desirable and that they are in fact difficult to produce, premises that are disputed by others in the field.

A further statistically derived supply-side theory of proliferation comes from Matthew Fuhrmann. In a 2009 article and subsequent book,

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[3] Feroz Khan, *Eating Grass: The Making of the Pakistani Bomb*. (Stanford: Stanford University Press, 2012), 87.
[4] Matthew Kroenig, "Importing the Bomb: Sensitive Nuclear Assistance and Nuclear Proliferation," *The Journal of Conflict Resolution* 53, no. 2 (2009): 161–180.
[5] Kroenig, "Importing the Bomb." 163.

Fuhrmann asserts that all peaceful nuclear cooperation, not just sensitive nuclear aid as claimed by Kroenig, contributes to the onset and completion of nuclear weapons programs.[6] He argues that civil nuclear cooperation develops the technical competence and confidence of success to allow leaders to initiate programs. He conducts statistical analysis of nuclear cooperation agreements (NCA) to show that NCAs significantly increase the likelihood of the initiation and completion of a nuclear weapons program, especially among states facing security threats. He concludes that NCAs are a necessary, though insufficient, requirement for the development of nuclear weapons. The implication is that "atoms for peace" policies have facilitated, not constrained as intended in the NPT, nuclear proliferation. While there is undoubtedly a correlation between NCAs and nuclear weapons development, several scholars have suggested that Fuhrmann has reversed the causal arrow and that civilian nuclear assistance is a consequence, not a cause of nuclear weapons proliferation[7]. In this view, states are likely to seek NCAs to further their pre-existing desire for nuclear weapons.

A refutation to the supply-side camp comes from outside the political science discipline. R. Scott Kemp, a professor of nuclear science and engineering at MIT, opposes technological limitation arguments by contending that indigenous development of nuclear weapons is not as difficult as one may think.[8] He bases this assertion on the relative simplicity of gas centrifuge technology which he states is within the developmental capabilities of most developing countries, even without atomic assistance. He claims that unlike other enrichment pathways,

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[6] Matthew Fuhrmann, "Spreading Temptation: Proliferation and Peaceful Nuclear Cooperation Agreements," *International Security* 34, no. 1 (2009): 7–41. Fuhrmann, Matthew. *Atomic Assistance : How "Atoms for Peace" Programs Cause Nuclear Insecurity*. Cornell Studies in Security Affairs. Ithaca: Cornell University Press, 2012

[7] Fuhrmann, Matthew, Christoph Bluth, Matthew Kroenig, Rensselaer Lee, and William C. Sailor. "Civilian nuclear cooperation and the proliferation of nuclear weapons." *International Security* 35, no. 1 (2010): 184-200

[8] Kemp, "The Nonproliferation Emperor Has No Clothes."

centrifuge technology is largely undetectable and that 13 of the 20 countries who have them, built them indigenously.

Kemp combines detailed technical knowledge of nuclear engineering with historical case studies to show that countries with even a 1960s level of technology could produce a workable centrifuge in about 24 months. He estimates that a state could obtain a centrifuge plant capable of producing one bomb per year for as little as $20 million. Kemp asserts that with the ease of online access to nuclear science and the spread of advance manufacturing technologies, nuclear weapons are achievable to all but the most poorly organized states. He argues, "the technologies needed to make nuclear weapons have remained static, whereas the indigenous capabilities of states have steadily grown over the last half-century. What was once exotic is now pedestrian, and nuclear weapons are no exception."[9] The accessibility of nuclear weapons technology refutes Kroenig and Fuhrmann's arguments of about the criticality of atomic assistance as well as undermining the intellectual basis for western nonproliferation policies consisting of supply side controls. Kemp concludes that because there are few true technological barriers for most states, addressing proliferation motivations is the key for both scholars and policymakers.

For US allies, supply-side limitations to potential proliferation have limited relevance. Most US allies which might be tempted to develop nuclear weapons are already more economically developed and technologically advanced than other states which have crossed the nuclear hurdle. Furthermore, many of these allies have existing civilian nuclear industries or prior experience with nuclear weapons programs. Opportunity or supply-side factors are not primary restraints on US allies and it is necessary to look to motivational or demand-side factors.

[9] Kemp, R. Scott, "The Nonproliferation Emperor Has No Clothes," 40.

Demand Side Theories of Nuclear Weapons Proliferation

The traditional and most intuitive explanation for why states desire nuclear weapons is security. This conventional wisdom is rooted in structural realism, the predominant theoretical paradigm of 20th century political science. This theory is premised on the imperatives and implications of international anarchy where there is no higher authority to which a state can appeal. According to the father of structural realism, Kenneth Waltz, "the state among states…conducts its affairs in the brooding shadow of violence. Because some states may at any time use force, all states must be prepared to do so."[10] This creates a self-help system where each state must look to its own interests using primarily force or the threat of force. Initially, realists saw nuclear weapons as a natural progression of force as the *ultima ratio* of international politics and many realists expected regular and widespread proliferation. [11] By the mid-1990s, the expected proliferation flood had only produced a trickle of nuclear weapons states. This lead many political scientists to search for alternative explanations for proliferation and restraint. Scott Sagan, the preeminent foil to Waltz and other realist proliferation optimists, summarized this search in his "Three Models in Search of a Bomb", the seminal work of the post-Cold War nuclear proliferation literature. In this article, Sagan establishes three alternative frameworks for explaining why states do or do not desire to pursue nuclear weapons.[12]

Sagan classifies one category of proliferation explanations as the "norms model" which derives from social constructivism and places the locus of analysis at the individual level. It explains states' decisions

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[10] Kenneth N. Waltz, *Theory of International Politics*, (Long Grove, IL: Waveland Press, 1979), 102.
[11] Scott D. Sagan and Kenneth N. Waltz. *The Spread of Nuclear Weapons: An Enduring Debate*. 3rd ed. (New York, NY: W.W. Norton & Company, 2013), 3.
[12] Scott Sagan, "Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb," *International Security* 21, no. 3 (1996): 54–86.

about nuclear proliferation in terms of "nuclear symbolism" or the beliefs by leaders about what is legitimate and appropriate in international relations. This model predicts that when leaders believe that nuclear weapons are symbols of a modern and powerful state they are more likely to pursue them whereas if nuclear proliferation is seen an activity of "rogue" actors they are less likely to. The norms model suggests that the establishment of the NPT regime in the 1970s represented a turning point in nuclear norms and predicts a greater optimism about halting future proliferation.

The second model Sagan identifies is the "domestic politics model" which locates the sources of proliferation in the bureaucratic maneuvering among nuclear scientists, military and security professionals, and politicians and parties. In the organizational theory tradition of Graham Allison and Donald Mackenzie, decisions to pursue or not pursue nuclear weapons are less rational choices and more resultants of the "pulling and hauling" of domestic coalitions with parochial interests.[13] In addition to organizational theories, many liberalist theories fit within this model. Because this model deemphasizes the centrality of security concerns, its policy implications emphasize the role of international institutions, particularly within the NPT regime, in dissuading potential proliferants and providing tools to empower domestic actors opposed to nuclear weapons.

A third model, the "security model", is the conventional wisdom explanation rooted in a structural realist understanding of state behavior. This model explains proliferation as simple state self-help in an anarchic international system and predicts that proliferation will beget proliferation. This model implies that extended security guarantees are

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[13] Graham T. Allison and Philip Zelikow, *Essence of Decision: Explaining the Cuban Missile Crisis*, 2nd ed (New York: Longman, 1999); Donald A. MacKenzie, *Inventing Accuracy: A Historical Sociology of Nuclear Missile Guidance*, 4. pr (Cambridge, Mass.: MIT Press, 2001).

important policy tools in mitigating future proliferation, but is pessimistic that the nonproliferation regime can overcome the necessity for states to look to their own security.

Sagan also identifies a fundamental contradiction in the policy prescriptions deriving from these models. If the security model is correct, the continued possession and deployment of nuclear weapons by the US in an extended deterrence role is essential to preventing proliferation by its allies. If the norms model is correct, the US's continued failure to move toward global zero, as promised in the NPT, undermines the nonproliferation norm and makes continued proliferation more likely.

Sagan's three models provide a useful framework for conceptualizing the "search for a bomb" that not only divides the literature by level of analysis, but also by theoretical paradigm. The theories within the "domestic politics" and "norms" models are constructivist and liberalist responses to the failure of reality to conform to realist expectations. Realists generally see the relative slow rate of proliferation as a temporary result of Cold War bipolarity and subsequent US unipolarity and that nuclear weapons are still highly desirable to states. Constructivists and liberalists think that more fundamental changes have obviated the attractiveness of nuclear weapons. In this thesis, I use Sagan's framework of individual, domestic, and systemic level theories to organize the demand-side explanations of nuclear proliferation.

Individual Level Theories

Norms based ideational theories privilege the role of ideas, beliefs, and conceptions of appropriateness in explaining international politics. These theories can derive from social constructivism and reside at the state/domestic level of analysis or emerge from psychological constructivism and focus on the beliefs of individual leaders. I address the latter in this section and save social constructive explanations for the

section on second image factors. The leading work on individual-level, psychological causes of proliferation is Jacques Hymans' *The Psychology of Nuclear Proliferation.*[14] In this work Hymans applies emotional psychology theory to the decision to develop nuclear weapons, the ultimate "big decision", which he argues is driven by a leader's emotions of fear and pride. He develops a typology of national identity conception (NIC) based on a national leader's subjective understanding of "what the nation naturally stands for and how high it naturally stands".[15] From this typology, Hymans concludes that the ascension of an "opposition nationalist" ideal type leader, in whom the emotions of fear and pride are most dominant, is "practically a sufficient condition to spark a decision to build the bomb, assuming a few other basic conditions apply."[16]

It is these "other basic conditions": intense security interaction, prior experience in the nuclear field, and centralized control over the state apparatus that undermines Hymans' argument. Hymans cannot prove that it is the NIC that is doing the causal work and not these other conditions. This lack of causal clarity is unalleviated by Hyman's case study selection of France, India, Australia, and Argentina all of whose proliferation decisions can be explained from a security perspective. While this individual psychological explanation illuminates the process by which leaders interpret and react to the international environment it is unconvincing in its reasoning for why states pursue nuclear weapons.

Second Image Theories

Second Image theories are explanations of international politics which focus on the state level, particularly at domestic or bureaucratic politics. This level of analysis subsumes the largest diversity of

[14] Jacques E. C. Hymans, *The Psychology of Nuclear Proliferation: Identity, Emotions and Foreign Policy* (Cambridge, UK ; New York: Cambridge University Press, 2006).
[15] Hymans, *The Psychology of Nuclear Proliferation*, 18.
[16] Hymans, *The Psychology of Nuclear Proliferation*, 36.

theoretical viewpoints including social constructivist theories, organizational theories, and liberalist theories. Some of these theories privilege material factors while others emphasize ideational ones. Scholars have offered theories deriving from all these paradigms to explain nuclear proliferation; one that is highly ideational is social constructivism.

The basic social constructivist argument for why states have pursued or not pursued nuclear weapons hinges on the norms and beliefs among states about the appropriateness of these weapons. According to this narrative, many states in the early atomic era saw nuclear weapons as a prestigious symbol of modernity and great power status. Non-state actors and anti-nuclear activists transformed the intersubjective meaning of nuclear weapons. The Nuclear Nonproliferation Treaty (NPT), which entered into force in 1970, formalized this normative transformation as upstanding states came to view nuclear proliferation as the activity of rogue and pariah states. Social constructivists emphasize the NPT as both the consequence and cause of normative change.

Per Martha Rost Rublee, a leading constructivist scholar of nuclear weapons, this occurs due to three social processes. "Persuasion" happens when changes in how states think about security lead them to forgo nuclear weapons. "Social conformity" occurs when states, without fully internalizing non-proliferation norms, exercise restraint due to fear of social costs and desire for social rewards. Similarly, "identification" is a social process where states follow the lead of a high-status NPT proponent or alliance because they highly value a relationship with that actor.[17]

[17] Martha Rost Rublee, *Nonproliferation Norms: Why States Choose Nuclear Restraint* (University of Georgia Press, 2009)., 27-28.

As an example of the normative force of early conceptions of nuclear weapons at the local level, Itty Abraham argues that India's pursuit of nuclear weapons was due to their post-colonial cultural context that fetishized the bomb as a symbol of progress and power. He observes that India was pursuing the "high-modernity" value of unlimited technological progress while the globalized culture was moving to a post-modern rejection of technological fanaticism based on environmental and human rights grounds. Abraham concludes, in defiance of many constructivists, local cultural contexts can supersede that the global normative level.[18]

An example of an ideational theory of nuclear proliferation that departs from social constructivism is Peter Lavoy's theory of "nuclear mythmaking".[19] Lavoy combines the psychology of myths with the processes of organizational theory. In his conception, national elites who desire nuclear weapons propagate "myths" about the efficacy of nuclear weapons for security and influence and the feasibility of their acquisition and employment. Without discounting the security threat variable that realists emphasize, Lavoy shifts the level of analysis to the domestic level where "mythmakers" seek to translate security requirements into nuclear acquisition policies. Lavoy argues that proliferation success depends on 1) the content of the nuclear myth and its compatibility with cultural norms and political priorities, 2) the ability of the mythmaker to persuade, and 3) the process by which institutions integrate the myth into their own priorities and identities. Lavoy thus melds the ideational aspect of mythmaking with an organizational mechanism for explaining the proliferation process, while leaving to security motivations to causal reasoning for proliferation itself.

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[18] Itty Abraham, *The Making of the Indian Atomic Bomb: Science, Secrecy and the Postcolonial State* (Zed Books, 1998).
[19] Peter R. Lavoy, "Nuclear Proliferation Over the Next Decade: Causes, Warning Signs, and Policy Responses," *Nonproliferation Review* 13 (November 2006).

A final domestic level of theory of proliferation comes from liberalism. Etel Solingen explains proliferation as a pluralistic contest between domestic factions over the politico-economic orientation of the state.[20] This internal struggle pits inward-looking security groups against outward-looking pressure groups who want to retain access to the broader economic system. She explains the difference in proliferation dynamics between East Asia and the Middle East as a function of the level of integration by states in the region into the global economy. Although her theory shifts the driving variable for state proliferation decisions from the external security environment to internal calculations of regime survival, it has implications at the systemic level. If Solingen is correct, as globalization drives states toward economic integration, the opportunity costs of nuclear proliferation should rise.

Although Solingen's theory is clearly in the liberal commercialist tradition it relies on a normative premise and shares a similar flaw with the normative theories. Her theory hinges on the assumption that the pursuit of nuclear weapons will have economically isolating effects. This assumption though is contingent on a normative nonproliferation regime in which only rogue or peripheral states pursue nuclear weapons. Given a different normative landscape nuclear weapons pursuit may not be economically isolating. One of the principles of social constructivist theory is that although norms are resilient, they can and do change. That change also may not always be in a progressive direction as changes in the international distribution of power and underlying security environment could lead to a regression in norms about nuclear weapons. To explain the underlying mechanisms of nuclear proliferation it is thus necessary to return to the third image of international relations analysis, the international system.

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[20] Etel Solingen, *Nuclear Logics: Contrasting Paths in East Asia and the Middle East* (Princeton University Press, 2009).

International System Level Theories

While early realists predicted that proliferation would be common and constant, actual development of nuclear weapons has been sporadic and rare. There have been several attempts by realist theorists to employ international system theories to explain this disconnect. T.V. Paul provides one such attempt as he uses realist logic to explain a gap in traditional realist explanations for proliferation: why states forgo nuclear weapons.[21] Paul explains the relatively slow spread of nuclear weapons by differentiating states by region and characterizing each region in terms of security interdependence. He argues that regions demonstrate security interdependence to the extent that the states within it are sensitive to the security moves of other regional states. While confining his analysis to medium and regional powers, Paul divides the world into ideal types zones of low, medium, and high conflict.[22] He finds that it is only in zones of high conflict, characterized by "enduring rivalries" and "protracted conflicts", that the prudent state finds the utility of nuclear proliferation to outweigh its negative externalities, namely internal balancing in arms races, external balancing with great powers, and economic isolation.

In this thesis, I adopt Paul's regional characterization by threat zone. I also use his concepts of "protracted conflicts" and "enduring rivalries" to define the threat term of my proliferation vector model. My intuition on the role of non-security proliferation determinants is similar to Paul's in that he argues that normative and domestic politics explanations can explain *how* proliferation occurred in a particular state, but not *why* proliferation occurs generally. He also argues that the NPT regime helps to promote transparency and reinforce the logics of

[21] T. V. Paul, *Power Versus Prudence: Why Nations Forgo Nuclear Weapons* (McGill-Queen's Press - MQUP, 2000).
[22] Paul, *Power Versus Prudence, 22*.

forbearance in low and medium conflict zones, but is unable to overcome proliferation pressures on states facing enduring rivalries in high conflict zones.[23]

Alexandre Debs and Nuno Monteiro recently advanced another recent third image theory.[24] They introduce a security-based theory of proliferation that places security threat motives into a strategic interaction context by examining the security environment a state faces while developing nuclear weapons. They employ four independent variables 1) level of security threat, 2) relative power, 3) ally commitment, and 4) cost of nuclear program operating through two intervening variables a) security benefit of proliferation and b) cost of preventive war to derive a dependent variable of nuclear status. Debs and Monteiro conduct case studies of Pakistan, South Korea, and West Germany to test their theory. They find that while nuclear weapons may be a great equalizer for weak states it is difficult for these states to develop them without a major power ally. Therefore, they conclude that two types of states are most likely to develop nuclear weapons: 1) powerful, but highly threatened states and 2) weaker states in loose alliances where they do not perceive their security needs are fully covered, but under which they are reasonably protected from preventative war to gain the time to develop a nuclear weapon.

Debs and Monteiro's introduction of gradation in alliance is an important advancement from the often binary treatment of security guarantee. I expand on this idea in my own theory by elaborating on the alliance conditions that signal great power commitment. To build a theory to explain a multi-causal phenomenon like nuclear proliferation, one needs to judge which of the suggested variables has the most

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[23] Paul, *Power Versus Prudence,* 28.
[24] Nuno Monteiro and Alexandre Debs, "The Strategic Logic of Nuclear Proliferation," *International Security* 39, no. 2 (2014): 7.

explanatory power. Multivariate statistical analysis provides an excellent way to do this.

Multivariate Quantitative Analysis

While all the preceding theories advance logical explanations for why some countries have pursued nuclear weapons, none can, on their own, explain the nuclear choices of all states. As Philipp Bleek writes, "while qualitative analysis can shed light on *whether* and by what mechanisms different variables matter, it sheds far less light on *how much* they matter relative to one another."[25] This task requires multivariate statistical techniques to assess the relative weight of each explanatory variable. There are, however, limitations to quantitative analysis. Many variables, particularly motivational ones, do not lend themselves to quantitative approximation. Furthermore, per Philipp Bleek, quantitative analysis masks variation in individual cases and can imply a misleading degree of precision.[26] Nonetheless, quantitative tests are useful for understanding nuclear proliferation.

Sonali Singh and Christopher Way construct the first modern quantitative analysis of the causes of nuclear proliferation using advanced statistical techniques.[27] They seek to supplement the univariate, deterministic logic of the qualitative theories with a multivariate, probabilistic approach. To do this they employ hazard

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[25] Philipp Bleek, "Why Do States Proliferate? Quantitative Analysis of the Exploration, Pursuit, and Acquisition of Nuclear Weapons," in *Forecasting Nuclear Proliferation in the 21st Century: The Role of Theory*, ed. William C. Potter and Gaukhar Mukhatzhanova, vol. 1, 2 vols. (Palo Alto: Stanford Security Studies/Stanford University Press, 2010), 161.

[26] Bleek, "Why Do States Proliferate? Quantitative Analysis of the Exploration, Pursuit, and Acquisition of Nuclear Weapons.", 162.

[27] Sonali Singh and Christopher R. Way, "The Correlates of Nuclear Proliferation: A Quantitative Test," *Journal of Conflict Resolution* 48, no. 6 (2004): 859–885. The only previous attempts to employ quantitative methodology to the problem of nuclear proliferation were Stephen Meyer's *The Dynamics of Nuclear Proliferation* (1984) and Charles Kegley's "International and domestic correlates of nuclear proliferation" in *Korea and World Affairs* (1980). I do not review this research here because their findings are superseded by the most advanced statistical techniques of the four cited articles and due to the datedness of their source information.

modeling and multinomial logit methodologies to test the prevailing theories of proliferation. Their research is notable in that rather treating the dependent variable of nuclearization as binary, they divide it into a spectrum ranging from "no interest" to "serious exploration" to "launch of a weapons program" and finally to "acquisition" as demonstrated by an explosive test or the assembly of a complete warhead. For the independent variable, Singh and Way test three broad categories of approaches: "technical determinants," "external determinants," and "internal determinants." They find evidence of a technological threshold, where the "likelihood of proliferation rises sharply with growth at low levels of development, but levels off and even declines at high levels."[28] Importantly for this thesis, they also show that security factors are the central determinants of proliferation with enduring rivalries and frequent militarized disputes strongly increasing the likelihood of proliferation. They also find that a great-power ally dampens the temptation for proliferation. On domestic variables, Singh and Way find support for Solingen's economic orientation thesis, but find that regime type is relatively unimportant. They conclude that the prevailing wisdom on nuclear weapons is largely correct. Technological factors are necessary, but insufficient independent variables while security factors have the greatest relative effect on states' nuclear decisions.

Building on the work of Singh and Way, Dong-Joon Jo and Eric Gartzke conduct multivariate regression analysis using a cross-section time-series from 1939 to 1992 in order to assess the domestic and international conditions which most affect states decisions to proliferate.[29] Their study differs from Sing and Way in that Jo and Gartzke categorize their independent variables in terms of "opportunity" and "willingness" rather than "technical", "external", and "internal".

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[28] Sonali Singh and Christopher R. Way, "The Correlates of Nuclear Proliferation", 861.
[29] Dong-Joon Jo and Erik Gartzke, "Determinants of Nuclear Weapons Proliferation," *The Journal of Conflict Resolution* 51, no. 1 (2007): 167–194

Despite these methodological differences, they arrive at similar conclusions as Singh and Way. They find that the diffusion of nuclear technology and knowledge increases proliferation. On the motivation side, the evidence strongly supported security arguments while it did not bear out normative or bureaucratic politics explanations. Jo and Gartzke conclude that regional and middle powers are the most likely to proliferate.

Harald Mueller and Andreas Schmidt offer a contrarian assessment of the determinants of nuclear proliferation and reversals.[30] While employing quantitative analysis like Singh & Way and Jo & Gartzke, they arrive at the profoundly different conclusion that norms, the NPT, and domestic regime type are most instrumental in explaining the initiation and termination of nuclear weapons activities. Mueller and Schmidt get to this differing assessment by changing the case-coding and by simplifying the typology of the weapons development process into only "nuclear weapons activity" (NWA) and "no nuclear weapons activity". They also pull into their study significantly more cases by including states that only tentatively explored nuclear weapons. With these changes, Mueller and Schmidt find that theories of technological or economic pull are unsubstantiated, that alliance guarantees are insufficient explanations for reversals, and that economic liberalization is not a comprehensive cause. They conclude that the most significant variables are normative change, manifested in the NPT and democratization.

The difficulty with Mueller and Schmidt's assessment of security guarantees is that they take an overly basic approach. They simply compare the proliferation tendency of aligned and non-aligned countries

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[30] Harald Mueller and Andreas Schmidt, "The Little-Known Story of Deproliferation: Why States Give Up Nuclear Weapons Activities," in *Forecasting Nuclear Proliferation in the 21st Century: The Role of Theory*, ed. William C. Potter and Gaukhar Mukhatzhanova, vol. 1, 2 vols. (Palo Alto: Stanford Security Studies/Stanford University Press, 2010).

and find that the there is no significant distinction between the two categories. This simplistic formulation fails to consider the calculation of preventative war which states make when considering nuclear weapons. As Debs and Monteiro note in their theory, a state without a great power protector is much more likely to be vulnerable to a preventative strike if it pursues a nuclear weapon. Therefore, though allied states may have less need of nuclear weapons since they have a protector, they are more likely to pursue nuclear weapons if they perceive the great power's security guarantee is insufficient, because they enjoy the luxury of pursuing nuclear weapons under the great power's extended deterrence guarantee.

A further problem with Muller and Schmidt's analysis is that they attribute the decline in the total number of states with nuclear weapons activities to a change in global norms beginning with the 1961 "Irish Resolution" in the UN general assembly and fully entering into force in 1968 with the signing of the NPT. Muller and Schmidt's own data seem to tell a different story. The total number of states with nuclear weapons activities continued to rise until 1981-1985 and only dropped precipitously in the 1991-1995 era. This decline could just as easily be explained by a change in the security environment rather than a change in norms. The removal of the Soviet threat made nuclear weapons less necessary for anti-Communist states, such as South Africa and Argentina. At the same time, the remaining superpower, the US, had increased freedom of action to intervene against potential proliferators which it considered hostile to its new liberal international order, such as Iraq and Algeria.

Philipp Bleek conducts a quantitative study that seeks to expand and improve, rather than refute, the work of Singh and Way and Jo and

Gartzke.[31] He uses hazard modeling like Singh and Way, but develops his own data set based on more robust historical sourcing. Bleek adopts Singh and Way's typology of "explore", "pursue", and "acquire" for the dependent variable, but blends their approach with Jo and Gartzke's for categorizing the explanatory variables.

Despite these modifications, Bleek arrives at similar findings as both the previous studies. He finds that economic and technical capacity is significant, but curvilinear, as it drops in significance as states become wealthier. Bleek also confirms the centrality of security explanations. He argues, "if an analyst were required to prognosticate proliferation dynamics on the basis of only one variable, states' conventional security environments would be the preferred choice."[32] Although Gartzke and Jo did not find that security guarantees had a statistically significant effect on proliferation, Bleek finds that they reduce the risk of exploration by 59%, pursuit by 86%, and acquisition by 99%. Bleek also makes an interesting discovery regarding reactive proliferation or the "nuclear domino theory". He finds that the pursuit of a nuclear weapon by a rival increases the likelihood of exploration by 400%, but has no statistically significant effect on exploration or acquisition. This effect is likely due to the relatively low cost of exploration and the ability of threatened states to gain security commitments with great powers hostile to further nuclear proliferation.

Bleek further finds that status and regime type variables are not significant factors. He is also ambivalent on the role of the NPT. He concludes that while those who have ratified the treaty are less likely to explore nuclear weapons, it is unclear whether the treaty is a cause or consequence of nuclear restraint. Many states join the NPT because they

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[31] Bleek, "Why Do States Proliferate? Quantitative Analysis of the Exploration, Pursuit, and Acquisition of Nuclear Weapons."
[32] Bleek, "Why Do States Proliferate? Quantitative Analysis of the Exploration, Pursuit, and Acquisition of Nuclear Weapons.", 184.

do not intend to pursue nuclear weapons and then the institutional arrangements impose costs, though not insurmountable ones, to reneging on that commitment. Overall, Bleek affirms a security-model explanation for the determinants of proliferation.

Bleek builds on his 2010 study in a 2014 article with Eric Lorber that specifically focuses on testing the importance of security guarantees to nonproliferation policies. They employ a multivariate hazard model with new dependent variable coding to find with high confidence that "states receiving security guarantees are less likely to explore, pursue, and acquire nuclear weapons." They pair this statistical analysis with a qualitative case study of the South Korea nuclear weapons program to conclude that there is a clear relationship between security guarantees and proliferation pressures. [33]

A final recent article adds some ambiguity to the relationship between security guarantees and nuclear proliferation. Dan Reiter pairs a quantitative analysis with a few very limited case studies to examine what factors affect proliferation by allies.[34] He adds to the existing work on this subject by considering entrapment and abandonment fears and adding foreign deployment of nuclear weapons as a dependent variable. He advances three hypotheses: 1) states facing greater threats and lower entrapment fears are more likely to accept security guarantees than build own weapons, 2) states facing higher threats but without offers of security commitments are more likely to acquire nuclear weapons, and 3) states facing higher threats, but with high levels of entrapment are more likely to choose to acquire nuclear weapons over accepting security

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[33] Philipp Bleek and Eric Lorber, "Security Guarantees and Allied Nuclear Proliferation," in *Nonproliferation Policy and Nuclear Posture: Causes and Consequences for the Spread of Nuclear Weapons*, ed. Neil Narang, Erik Gartzke, and Matthew Kroenig (Routledge, 2015), 69–93.

[34] Dan Reiter, "Security Commitments and Nuclear Proliferation," in *Nonproliferation Policy and Nuclear Posture: Causes and Consequences for the Spread of Nuclear Weapons*, ed. Neil Narang, Erik Gartzke, and Matthew Kroenig (Routledge, 2015), 94–114.

commitments. Reiter is only able to quantitatively test the second hypothesis which he confirms empirically. He also finds a strong correlation between the deployment of foreign nuclear weapons and a lack of nuclear weapons acquisition (though not pursuit) as no state in this situation has ever acquired their own weapons. Controversially, he does not find that a defense pact with a nuclear ally or that basing troops in in country significantly reduces the likelihood that a state will acquire nuclear weapons, although his qualitative analysis tempers this finding.

For his qualitative portion, Reiter provides only brief anecdotes to test his hypotheses. He offers West Germany and South Korea as examples where abandonment fears trumped entrapment concerns and security guarantees replaced nuclear programs. He claims Israel, South Africa, Pakistan are all examples of states where abandonment fears and insufficient security commitments led to nuclear acquisition. Reiter suggests France and Great Britain's nuclear acquisition demonstrate how both abandonment and entrapment fears led states to favor their own weapons over foreign nuclear deployment. Reiter concludes that security commitments do affect proliferation motivations, but formal alliance terms are likely less important than perceptions about the ally's credibility.

Despite the recent enthusiasm for normative and domestic explanations, a review of the literature on the causes of nuclear proliferations show that traditional explanations appear to hold. Security interests drive states; when threatened and unable to meet their security obligations through other means, states will look to nuclear weapons. This fundamental supposition is the basis for my model of nuclear proliferation. I build on the existing literature on nuclear proliferation by combining Paul's threat level differentiation by region and dyadic relationship with a more granular typology of alliance commitment. Furthermore, I suggest that it is not only the objective conditions of the

alliance, but also the subjective perception of the relationship's vector that drives proliferation calculations.

Chapter 3

Allied Proliferation Vector Model

In addition to security variables, the literature on the causes of nuclear proliferation highlight normative, domestic/bureaucratic, and technological factors that affect a state's decisions regarding nuclear weapons. While these factors are important, it is clear from the literature that a state's security is the primary driver of its decisions about nuclear weapons. What is unclear is how a state operationalizes its security. At its most basic, a state's level of security is a balance between the threats facing the state and its ability to counter those threats. A state's threat perception includes both the general instability of its region as well as any acute threats it faces from conflictual dyads. A state can counter security threats by two means: "external balancing"- relying on a defensive alliance or "internal balancing"- mobilizing and developing its own military capability. Nuclear weapons, through secure second strike retaliatory capability, represent the ultimate expression of internal balancing. The former approach is cheaper, but less certain while the latter allows greater autonomy, but at the cost of other state economic goals. This tradeoff is the eternal self-help dilemma of international security.

Most states strike some equilibrium between internal and external balancing by both fielding organic militaries and participating in collective security. The most extreme form of internal balancing is the acquisition of nuclear weapons. Most US allies exceed the technological and economic threshold to develop nuclear weapons, but of the 63 treaty or major non-NATO allies, only four possess nuclear weapons. What explains this general restraint as well as the few exceptions?

I propose that a US ally's movement toward nuclear weapons is a function of the threat it faces and the United States' commitment to it. If the threat outweighs the level of US commitment, then the ally will be motivated to explore or pursue nuclear weapons. The relationship would be expressed as: $f(P) = T - C$ or Proliferation = Threat – Commitment.

Unfortunately, such a simple formula does not fully capture the complexity of the situation. The expression above is based on objective conditions, but since what is at issue is state motivation what matters is the ally's perception of those conditions. Thus, a more fulsome hypothesis is that a US ally's movement toward nuclear weapons is a function of the ally's threat perception counterbalanced by its perception of US commitment to its defense. This relationship can be expressed in what I call the Allied Proliferation Vector model:

$f(P) = T_p - C_p$ or Proliferation = perceived Threat – perceived Commitment

where P is a forward proliferation vector along a spectrum of nuclear weapons activities. T_p and C_p are discrete values between 1 and 3 based on objective criteria for the ally's threat environment and the United States' enacted level of commitment. The $_P$ subscript represents the ally's perception of the United States' commitment to its defense. I hypothesize that when an ally perceives its threat environment to be higher than the level of US commitment then it is likely to move forward down a pathway toward nuclear weapons. This is true whether the state faces a severe conventional or nuclear threat. When the perceived US commitment level exceeds the threat level, the ally will cease forward movement toward nuclear weapons and may, with sufficient counter-pressure, even roll back its program. To illustrate how these threat and commitment influence proliferation, I will explain each element beginning with the proliferation pathway.

Nuclear Proliferation Pathway

What is nuclear proliferation? Clearly, building and testing a nuclear device is proliferation, but what about establishing a weapons research organization or developing dual-use technology? The line between peaceful nuclear use and nuclear weapons activity is often blurry and always shrouded in secrecy. There are actions that are legal under the Nonproliferation Treaty that still allow a state to move toward developing nuclear weapons. Todd Robinson has argued that there is no clear consensus on the meaning of proliferation and that "geopolitical context and perception bias can have a significant effect on how we conceptualize and define the term."[1] The United States is quick to label as "proliferation" nuclear activity by an adversary such as Iran, but may be reluctant to call out similar activity by an ally. To avoid any value judgment or wrangling over legal definitions, in this model I consider as proliferation any action that ties nuclear research with weaponization and advances a state closer to achieving a nuclear weapon.

To judge forward movement, I borrow Singh and Way's typology of a four-category proliferation pathway: Null → Exploration → Pursuit → Acquisition. States in the Acquisition stage are most obvious as this stage requires either the explosion or assembly of a complete nuclear device. The line between Exploration and Pursuit is not as clear, but Pursuit would require a deeper level of commitment as manifested in an explicit decision by senior leaders to acquire weapons or the development of single-use dedicated technology. Exploration is the broadest category and would include states simply considering nuclear weapons as indicated by political authorization to investigate the feasibility of weapons development or deliberately linking nuclear research with military or defense agencies. [2] States in the Null category, while perhaps

[1] Todd C. Robinson, "What Do We Mean by Nuclear Proliferation?," *The Nonproliferation Review* 22, no. 1 (January 2, 2015): 67.
[2] Sonali Singh and Christopher R. Way, "The Correlates of Nuclear Proliferation."

having civilian nuclear energy programs, will have not taken these deliberate weaponization steps. While the length of each stage of this process varies and future proliferators could leapfrog individual stages by purchasing external support, this is a reasonable and useful categorization to conceptualize movement toward nuclear weapons.

Threat

The second element of the Allied Proliferation Vector model is the threat, represented by T_p. Specifically, this factor is the ally's self-perception of its threat environment. Stephen Walt has argued that states engage in balancing or bandwagoning behavior not simply due to a rational calculation of another state's power, but to their perception of how dangerous another state is to itself.[3] Developing nuclear weapons, which is a form of internal balancing, holds to the same logic. It is the state's perception of its security environment that matters, not an objective outsider's view. South Africa's pursuit of nuclear weapons during the Cold War to counter their perceived threat from Communist incursion is a relevant example. We can never know exactly how another state sees the world. This uncertainty makes the external prediction of a state's proliferation activity inherently flawed; yet, we can approximate a state's threat perception based on objective conditions.

Regional Threat Zones.

To achieve this approximation, we can characterize the threat level of a state's neighborhood. T.V. Paul provides a useful categorization of regional threat zones. He divides the world into high, moderate, and low threat zones based on the balance between security and economic concerns. High threat zones are regions where security interests

[3] Stephen M. Walt, "Alliance Formation and the Balance of World Power," *International Security* 9, no. 4 (1985): 3–43.

predominate to the exclusion of economic concerns. These regions experience frequent militarized interstate disputes (MIDs). Moderate threat zones display a rough parity between security competition and economic integration in interstate relations. Low threat zones have a high level of economic interdependence and infrequent militarized interstate disputes.[4]

Using the Correlates of War (COW) project dataset, it is possible to quantify the frequency of militarized interstate disputes (MID).[5] This dataset has captured in standardized form all MIDs from 1816 to 2010. According to the COW codebook MIDs include all of the following activity:

Table 1: Militarized Interstate Dispute Activity Levels

Threat to use force	2 Threat to blockade
3 Threat to occupy territory	4 Threat to declare war
5 Threat to use CBR weapons	6 Threat to join war
7 Show of force	8 Alert
9 Nuclear alert	10 Mobilization
11 Fortify border	12 Border violation
13 Blockade	14 Occupation of territory
15 Seizure	16 Attack
17 Clash	18 Declaration of war
19 Use of CBR weapons	20 Begin interstate war
21 Join interstate war	

Source: Faten Ghosn and Scott Bennett. Codebook for the Dyadic Militarized Interstate Incident Data, Version 3.10. 2003. http://correlatesofwar.org *accessed 9 February 2017.*

In addition to frequency, it is also possible to quantify the intensity of MIDs. By distinguishing "Severe MIDs" from "All MIDs", I discriminate between threats and action. I characterize as "Severe MIDs" disputes in which the highest level of action by the aggressing state was a "13 Blockade" or higher.

[4] Paul, *Power Versus Prudence*.
[5] Palmer, Glenn, Vito D'Orazio, Michael Kenwick, and Matthew Lane. 2015. "The MID4 Data Set: Procedures, Coding Rules, and Description." *Conflict Management and Peace Science*. Forthcoming.

In typifying a regional or sub-regional threat zone I use both severe and all MIDs. I characterize low external threat zones as having less than 10 severe MIDs and less than 15 total MID in a ten year period. I regard as a moderate regional threat zone, highlighted in yellow, those sub-regions that experience between 10 and 15 severe MIDs or 20 and 30 total MIDs. High conflict zones are sub-regions that experience more than 15 severe MIDs or more than 30 total MIDs in a ten-year period. I indicate these regions in red in the chart below.

Table 2: Threat Zone Criteria

Threat Zone	All Militarized Interstate Disputes	Severe Militarized Interstate Disputes	Color
Low	< 15	<10	Green
Moderate	20-30	10-15	Yellow
High	>30	>15	Red

Source: Author's Original Work, data for MIDs derived from Faten *Ghosn and Scott Bennett. Codebook for the Dyadic Militarized Interstate Incident Data, Version 3.10. 2003.* http://correlatesofwar.org *accessed 9 February 2017.*

As an example of the empirical categorization of regional threat zones, I conducted a statistical analysis of MIDs from 1992-2001. I analyzed the number of MIDs in this timeframe and calculated both broad continental regional totals as well as more specific sub-regional totals. In the model, I assign scores by sub-region to capture the granularity of differences within a region. The regional and sub-regional totals are summarized below:

Table 3: Threat Zones by Region, 1992-2001

Region	All Militarized Interstate Disputes	Severe Militarized Interstate Disputes
Western Hemisphere	36	22
- North America	5	5
- Central America	17	7
- South America	14	9
Europe	74	35
- Eastern Europe & Caucasus	69	32
- Western Europe	5	3
Sub-Saharan Africa	46	21
- West Africa	21	13
- East Africa	23	11
- Southern Africa	7	2
Middle East, North Africa, & Horn of Africa	65	44
- Middle East	47	30
- North Africa	9	7
- Horn of Africa	9	8
Asia	72	35
- Oceania	2	2
- Central Asia	11	7
- South Asia	7	5
- East Asia	33	9
- SE Asia	19	11

Source: Author's Original Work, data for MIDs derived from Faten Ghosn and Scott Bennett. Codebook for the Dyadic Militarized Interstate Incident Data, Version 3.10. 2003. http://correlatesofwar.org *accessed 9 February 2017.*

There are several weaknesses to this regional threat characterization. First, the breaks between threat zones are somewhat arbitrarily drawn. An area for further research and more sophisticated analysis would be to determine zone breaks by non-parametric statistics. Also, each sub-region is not uniform in terms of size, number of states, or population. Sub-regions could be standardized according to each of these characteristics or threat levels could be calculated according to the average MID per state. Finally, a regional view can obscure high threat

dyads within the region. For example, Pakistan and India have been engaged in a protracted conflict for most of their post-colonial history, but this relationship is obscured by the relative peacefulness of the broader South Asian region. To amend this, it is necessary to capture protracted conflicts and enduring rivalries among state dyads.

Protracted Conflict.

A "protracted conflict" is a long-standing, intense conflict often over highly emotional issues such territory, ideology, or ethnic disputes which involve intra-societal hostility with sporadic outbreaks of crisis and even war.[6] I quantify this relationship by stating that a dyad is in a protracted conflict if they are in a MID for more than 500 days in a ten-year period. As an example, the table below summarizes dyads in a protracted conflict during the 1990s.[7]

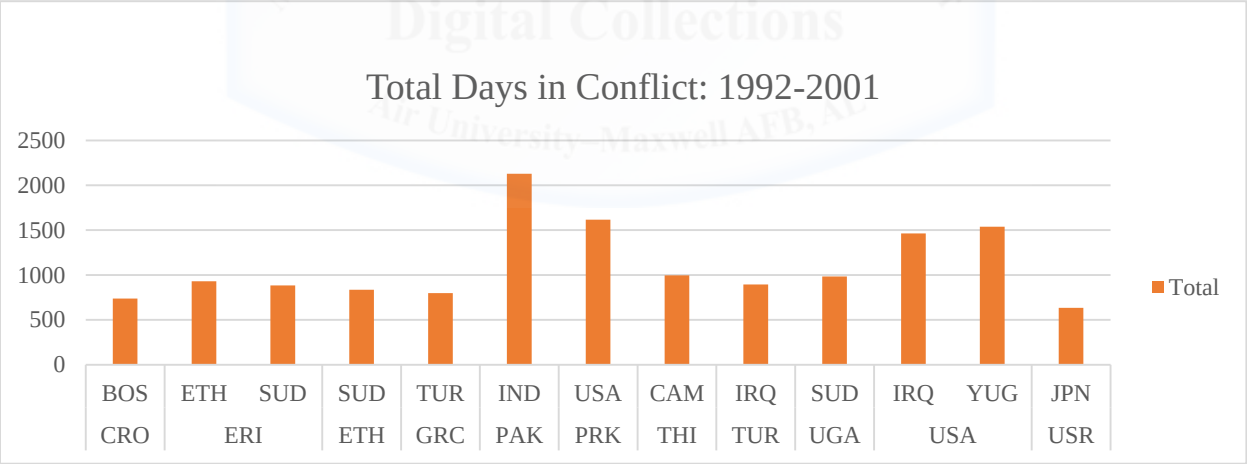

Figure 1: Protracted Conflicts from 1992-2001
Source: Author's Original Work, data for MIDs derived from Faten Ghosn and Scott Bennett. Codebook for the Dyadic Militarized Interstate Incident Data, Version 3.10. 2003. http://correlatesofwar.org *accessed 9 February 2017.*

[6] Paul, *Power Versus Prudence,* 20
[7] Data derived from Faten *Ghosn and Scott Bennett. Codebook for the Dyadic Militarized Interstate Incident Data, Version 3.10. 2003.* http://correlatesofwar.org *accessed 9 February 2017.*

Enduring Rivalry.

While similar to a protracted conflict, an enduring rivalry is a different type of contentious dyad. Paul distinguishes an enduring rivalry as a relationship between two states of zero-sum competition with at least five militarized interstate disputes (MIDs) in a twenty-year period, in which the states lack membership in a common alliance, and have low levels of economic interaction.[8] As an example, the table below summarizes the enduring rivalries from 1992-2001 in terms of dyads with more than five total MIDs.[9]

Table 4: Enduring Rivalries from 1992-2001

Dyad	Militarized Interstate Disputes
USA vs Iraq	7
UK vs Iraq	5
Russia vs Afghanistan	6
Armenia vs Azerbaijan	6
Iran vs Iraq	5
Greece vs Turkey	7
Iraq vs Turkey	5
Kuwaiti vs Iraq	7
China vs Taiwan	5

Source: Author's Original Work, data for MIDs derived from Faten Ghosn and Scott Bennett. Codebook for the Dyadic Militarized Interstate Incident Data, Version 3.10. 2003. http://correlatesofwar.org *accessed 9 February 2017.*

For the Allied Proliferation Vector model, I build from Paul's categorization and assigned a threat score based on the ally's threat zone. I assign states within a low threat zone a score of "1", states in a moderate threat zone I score as a "2", and states in high threat zones earn a score of "3" in my typology. I also amend the basic regional framework by scoring as a "3" any state with an enduring rivalry or in a

[8] Paul, *Power Versus Prudence,* 20.
[9] Data derived from Faten *Ghosn and Scott Bennett. Codebook for the Dyadic Militarized Interstate Incident Data, Version 3.10. 2003.* http://correlatesofwar.org *accessed 9 February 2017.*

protracted conflict, regardless of regional zone. This enduring rivalry can produce proliferation effects that are uncharacteristic of the general region. As an example, Argentina and Brazil engaged in a low-level enduring rivalry for much of the Cold War during which the Argentines explored and pursued nuclear weapons despite residing in a generally low threat zone.[10] The Threat, T, scoring typology is summarized in the table below. This score represents the objective threat to a given state based on actual interstate disputes.

Table 5: Perceived Threat Environment, T_p, Scoring Typology

Perceived Threat Environment	Threat Score
Low External Threat Zone	1
Moderate Threat Zone	2
High Threat Zone or Protracted Conflict (>500 days MID) or Enduring Rivalry (>5 MIDs)	3

Source: Author's Original Work

Commitment

The final element of the Allied Proliferation Vector model, represented by Cp, is the perceived level of US commitment. This is not an objective level of commitment from the US perspective, but the subjective reading of US commitment, as perceived by its allies. The problem of assuring allies, along with deterring enemies, is the fundamental challenge of extended deterrence. Fifty years ago, Thomas Schelling wrote about the difficulty of credibly committing, in the eyes of enemies, that the United States would actually go to war on another's behalf. Extended deterrence must not only convince the enemy, but also the ally, who is caught in constant fear between abandonment and entrapment. Schelling asserted that while it easy to convince the Soviets the United States will defend California, it is harder to convince them it

[10] Paul F. Diehl and Gary Goertz, *War and Peace in International Rivalry* (University of Michigan Press, 2001).

would defend Seoul or Berlin. The effectiveness of deterrence, then, "often depends on attaching to particular areas some of the status of California."[11] How does the United States do this? The United States signals its commitment by imposing potential credibility and material costs on itself. Allies' necessity for self-protection, as embodied in nuclear proliferation, is inversely proportional to their perception of the United States' commitment to their defense.

International Order.

The baseline level of commitment derives from the United States' traditional role as the guarantor of the rules-based international order. If a state is complying with the normative framework of the US-led order there is an implicit minimal level of protection. This protection is one of the public goods that the United States provides in what G. John Ikenberry calls the hegemonic "institutional bargain".[12] In exchange for the United States supplying this public good and for operating within the framework of international institutions, states within the order refrain from challenging the United States' military dominance and grant it outsized influence in shaping the order's rules. The 1991 liberation of Kuwait from Iraqi invasion is an example of US protection of a non-ally.

The recognition of US global responsibility is even evident in Russian actions in Georgia and Ukraine. While these actions were clearly pushing back against US global leadership, they also sought to exploit legal ambiguities to weaken a US response. Russia claimed its 2008 invasion of South Ossetia and Abkhazia was a "peace enforcement" under the mandate of the Joint Control Commission. Its annexation of Crimea was supposedly in response to a popular referendum to return to

[11] Thomas C. Schelling, *Arms and Influence* (New Haven: Yale University Press, 1966), 56.
[12] G. John Ikenberry, *Liberal Leviathan: The Origins, Crisis, and Transformation of the American World Order*, Reprint edition (Princeton University Press, 2012), 209.

Russia.[13] While the validity of these "lawfare" justifications is suspect, that the Russians even bothered with them are evidence of the rules-based order which the United States seeks to uphold. The United States has no legal obligation to defend a non-allied "responsible actor"; however, it does have an incentive in the form of the institutional bargain. If the United States fails to defend an international law-abiding state from extraterritorial aggression, it risks damage to its reputation as the upholder of the rules-based order. This reputation loss could invite further aggression, make future collective agreements harder, and even cause states to bandwagon against the United States.

Alliances.

Alliances and collective security agreements represent the second level of US commitment. Although this may seem straightforward, there are several gradations of formality in US security agreements. The most formal, and likely binding, are mutual defense treaties signed by the President and ratified by the Senate. The North Atlantic Treaty Organization (NATO) with its Article Five mutual defense obligation is one of the United States' most prominent and robust commitments. The United States also extends collective security guarantees to the Western Hemisphere under the 1947 Rio Treaty. The 1954 Southeast Asia Treaty, created a collective security pact among the United States, Australia, France, New Zealand, Philippines, Thailand, and the UK. The United States also has bilateral defense agreements with Japan and South Korea.[14] While these are the United States' only formal mutual defense treaties, the United States can impart security commitments to states in other ways.

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[13] Serhii Plokhy, *The Gates of Europe: A History of Ukraine*, 1st ed. (New York: Basic Books, 2015). 341.

[14] US State Department, "U.S. Collective Defense Agreements," https://www.state.gov/s/l/treaty/collectivedefense/, accessed 30 January 2017.

One non-treaty method of signaling security commitment is through the designation of Major Non-NATO Ally (MNNA) status. Established in 1989, the President, after notifying Congress, can confer this status which provides access to training and arms export benefits and reflects that state's security importance to the United States.[15] According to Title 22 of US law, the United States' current MNNAs are "Afghanistan, Argentina, Australia, Bahrain, Egypt, Israel, Japan, Jordan, Kuwait, Morocco, New Zealand, Pakistan, the Philippines, Republic of Korea, Thailand, and Tunisia. Taiwan shall be treated as though it were designated a major non-NATO ally."[16] The legislative branch can also impart a level of security commitment when the treaty-making executive branch is reluctant to do so. Examples of Congress enshrining defense commitments in law including the 2013 United States-Israel Strategic Partnership Act and the 1979 Taiwan Relations Act.

Defense agreements carry great reputational costs for US credibility. Beyond an implicit notion of public goods, the United States has made an explicit commitment to come to the defense of another state. To renege on these commitments would not only damage the United States' reputation, but in the case of collective security agreements, it would undermine the entire collective security institution. These institutions, such as NATO, serve not only as collective defense against external threats, but also promote stability and reduce the security dilemma among members of the alliance. The United States' interest in this regional stability is the basis of its credibility in upholding collective security agreements.

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[15] Legal Information Institute, "22 U.S. Code 2321k; Designation of major non-NATO allies," Cornell University Law School, https://www.law.cornell.edu/uscode/text/22/2321k, accessed 30 January 2017.
[16] Legal Information Institute, "22 U.S. Code 120.32; Major non-NATO ally," Cornell University Law School, https://www.law.cornell.edu/cfr/text/22/120.32 , accessed 15 February 2017.

Military Deployments.

The final and most extensive level of US commitment is the stationing of US troops and weapons within a country. Within this category, there are levels of commitment as well. The United States can station enough forces to provide the host country with an operational advantage in the event of an attack. This level of commitment is rare and is likely to be unsustainable except when defending against relatively weak adversaries. In the case of defending an ally against a great power enemy, the role of US forces is much more likely to be that of a "trip wire" or "plate glass window". As Schelling writes about the US garrison in Berlin, against the mass of the Soviet Union, "what can 7,000 American troops do, or 12,000 Allied troops? Bluntly, they can die. They can die heroically, dramatically, and in a manner that guarantees that the action cannot stop there. They represent the pride, the honor, and the reputation of the United States government and its armed forces."[17] US military deployments increase the credibility of US commitment by ensuring that the American public has skin in the game.

Although the deployment of military forces represents the highest level of US commitment to an ally's defense, the ally's perception of this commitment is not so straightforward. An ally must constantly assess its great power patron for signs of abandonment and so is highly sensitive to potential shifts in US intentions. An ally is likely to view a unilateral troop reduction as the harbinger for complete withdrawal and may undertake internal balancing actions. Alternatively, an increase in arms sales and joint training or the creation of a unified command structure can pacify allied fears by creating a greater US stake in the ally's future.

The specific posture of US military forces can also serve as signal of the United States' future intentions and set allied expectations about US credibility. Rotational deployments of military forces lend the least

[17] Schelling, *Arms and Influence*, 1966, 47.

credibility. Their transitory nature implies a temporariness and the lack of permanent infrastructure mandates a constant readiness for redeployment. The current US Army rotational brigade in Poland represents this level of commitment. The next highest level of commitment is a permanent military garrison. By investing in long-term facilities and permanent stationing of troops, the United States is pledging its long-term interest.

The final and most committing posture involves the assigning of military forces accompanied by dependents. The presence of spouses and children imply a greater investment in terms of support facilities such DOD schools, commissaries, and accompanied housing. More than that, though, dependents present a grave risk of retaliation if attacked. According to the famed ethicist Michael Walzer, the soldier, by picking up a rifle, makes himself both dangerous and endangered.[18] His life is forfeit because he is able to foreclose on another's life. Spouses and children have undertaken no such obligation and therefore their potential death carries greater opprobrium and almost certain demand for vengeance by the American public. By placing innocent Americans between an ally and adversary, the United States creates in Schelling's words, "the threat that leaves something to chance."[19] By creating conditions which may spiral out of rational control, the United States can strengthen the credibility of an incredible claim: that the United States will consider an attack on an ally as an attack on itself.

For the Allied Proliferation Vector model, I score perceived commitment based on the level of US-ally relationship. A non-rogue state with which the United States has normal diplomatic relations receives a score of "1". A formal treaty ally or MNNA earns a "2". Representing the highest level of commitment is an ally with a US troop deployment

[18] Michael Walzer, *Just and Unjust Wars: A Moral Argument with Historical Illustrations*, 5 edition (New York: Basic Books, 2015), 145.
[19] Schelling, *Arms and Influence*, 1966, 121n.

greater than 100 military members in each year. This relationship is scored as a "3". The Perceived Commitment, Cp, score typology is depicted in the table below:

Table 6: Perceived Commitment, Cp, Scoring Typology

US-Ally Relationship	Perceived Commitment Score
Responsible Actor	1
Treaty Ally or MNNA	2
Ally with US troop deployment	3

Source: Author's Original Work

This perception score, though, is not based on the objective conditions of the relationship, but on the ally's perception of the future of the relationship. The ally must "lead" its decisions about self-defense the way a quarterback leads a receiver. Because self-arming, particularly with nuclear weapons, takes time, a state must make its armament decisions today based on where it expects to be in the future. Thus, as seen in the story of the South Korean weapons program, nuclear proliferation anticipates abandonment and lags assurances.

Chapter 4

Something is Rotten in the State of South Korea

South Korea's nascent nuclear weapons program in the 1970s represents one of the clearest examples of the relationship between nuclear proliferation and a state's threat and allied commitment perceptions. This chapter will provide an overview of the South Korean (Republic of Korea or ROK) weapons program and the circumstances surrounding its initiation and termination. It will then analyze the South Korean threat environment and perception of US commitment level based on the criteria of the Allied Proliferation Vector model. This case clearly demonstrates an instance when an ally anticipating US abandonment in the context of a severe threat environment, sought to ameliorate this security dilemma by pursuing nuclear weapons.

The story of the South Korean nuclear weapons program begins hundreds of miles from Seoul on the small island of Guam. There, on July 25, 1969, US President Richard Nixon announced that "as far as the problems of internal security are concerned, as far as the problems of military defense…the United States is going to encourage and has a right to expect that this problem will be increasingly handled by, and the responsibility for it taken by, the Asian allies themselves."[1] While this policy, which became known as the Guam or Nixon Doctrine, was primarily intended to signal the beginning of "Vietnamization" in South Vietnam, it also indicated a general American reluctance to become mired in another war in Asia. Nixon's rhetoric became reality when in July 1970 the US officials notified the South Korean government that they would be reducing US forces in Korea

[1] Mitchell Reiss and Jonathan D. Pollack, "South Korea," in *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices*, ed. Kurt M. Campbell, Robert J. Einhorn, and Mitchell Reiss (Washington, D.C: Brookings Institution Press, 2004), 261.

In response to this shift in US policy, ROK President Park Chung-hee launched a program of defense self-reliance and modernization of the armed forces. This plan, titled "Yulgok", sought to import modern defense weapons along the line of the Israeli national defense system.[2] Also, similar to Israel, this defense reform included the clandestine exploration of nuclear weapons. Toward this end, South Korea, in 1971, established the Agency for Defense Development and the Weapons Exploitation Committee under whose auspices the ROK armed forces could secretly develop nuclear weapons.[3] Although South Korea had begun construction of a light water reactor in 1970, in 1975 Seoul also contracted to purchase a plutonium reprocessing plant from France and a heavy water reactor from Canada.[4] In December 1976, South Korea established the Korea Nuclear Fuel Development Institute (KNFDI) to build indigenous expertise in reprocessing techniques and plutonium production which enabled it to complete construction of a fuel fabrication plant in 1978.[5] By the 1980s, though, South Korea had suspended its nuclear weapons program, "disbanding a group of 870 scientists engaged in sensitive work"[6] and cutting off direct funding to the KNFDI.[7] Despite some "dabbling" as late as 2000, according to Hersman and Peters,

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[2] Republic of Korea, Institute for Military History, ed., *The History of the ROK-US Alliance, 1953-2013* (South Korea: Institute for Military History Compilation, Ministry of National Defense, 2014), 139.
[3] Scott Snyder, "South Korean Nuclear Decisionmaking," in *Forecasting Nuclear Proliferation in the 21st Century: A Comparative Perspective*, ed. William Potter and Gaukhar Mukhatzhanova, vol. 2, 2 vols. (Stanford, Calif: Stanford Security Studies, 2010), 161.
[4] Rebecca K. C. Hersman and Robert Peters, "Nuclear U-Turns: Learning from South Korean and Taiwanese Rollback," *The Nonproliferation Review* 13, no. 3 (November 2006), 541.
[5] Kang Choi and Joon-Sung Park, "South Korea: Fears of Abandonment and Entrapment," in *The Long Shadow: Nuclear Weapons and Security in 21st Century Asia*, ed. Muthiah Alagappa (Stanford, Calif: Stanford University Press, 2008), 376.
[6] Mark Fitzpatrick, *Asia's Latent Nuclear Powers: Japan, South Korea and Taiwan*, Adelphi 455 (London: Routledge for International Institute for Strategic Studies, 2016), 21.
[7] Snyder, "South Korean Nuclear Decisionmaking," 162.

"South Korea has not had an active weapons in more than two decades."[8] What explains South Korea's decade-long exploration but eventual abandonment of nuclear weapons? We can use the Allied Proliferation Vector Model to explain the relationship among South Korea's threat environment, their perception of US commitment, and their movement along a nuclear weapons proliferation pathway.

In applying the Allied Proliferation Vector model to the South Korean case, it is clear there was forward movement along the Proliferation Vector term. Before 1970, South Korea had no nuclear weapons program and only a small civilian research reactor.[9] By 1975, South Korea had established the bureaucratic apparatus to oversee weapons development and was in the nascent stages of fissile material production research. This activity meets the definition of the Exploration stage as established in Chapter 3 of this thesis (and derived Singh and Way's typology) of investigating the feasibility of weapons development or deliberately linking nuclear research with military or defense agencies.

The 1970s South Korean program, though, probably never made it to the Pursuit stage that would have required an explicit decision by senior leaders to acquire weapons or the development of single-use dedicated technology. While it is impossible to prove the true intent of President Park ex post facto, the material conditions do not support a characterization of the South Korean program as being in the Pursuit stage. Although some contemporary reports forecasted that the South Koreans could have developed a weapon by the mid-1980s, analyst Mark Fitzpatrick finds this counterfactual claim as overstated. He argues, "South Korea had no reactor designed to produce weapons-grade plutonium, no reprocessing plant or uranium-enrichment facility and no missiles capable of carrying of carrying nuclear warheads."[10] If the South

[8] Hersman and Peters, "Nuclear U-Turns," 542.
[9] Reiss and Pollack, "South Korea," 258.
[10] Fitzpatrick, *Asia's Latent Nuclear Powers,* 21.

Koreans began the exploration of nuclear weapons, but stopped short of full pursuit, what explains this proliferation movement? To explain change in the dependent variable of proliferation movement, we must examine independent variables of threat and perceived commitment, represented by T and C_p respectively in the Allied Proliferation Vector model.

The character of a state's region is an important of component of the threat environment that a state faces. Using the analytical framework established in Chapter 3, we can characterize the threat which South Korea in the period leading up the initiation of their nuclear weapons program by calculating the frequency and intensity of militarized interstate disputes (MIDs) in East Asia. For analytical purposes, I define East Asia as China, Taiwan, Japan, and the Koreas and count all MIDs in which one of those states was a party. We can characterize East Asia in the early 1970s as a high, moderate, or low threat zone by comparing of frequency and intensity of these MIDs to the threat zone criteria I established in Chapter 3. For reference, those criteria from Chapter 3 are listed below.

Table 1: Threat Zone Criteria

Threat Zone	All Militarized Interstate Disputes	Severe Militarized Interstate Disputes	Color
Low	< 15	<10	Green
Moderate	20-30	10-15	Yellow
High	>30	>15	Red

Source: Author's Original Work, data for MIDs derived from [1] *Faten Ghosn and Scott Bennett. Codebook for the Dyadic Militarized Interstate Incident Data, Version 3.10. 2003. http://correlatesofwar.org accessed 9 February 2017.*

It is clear from the data that East Asia in the early 1970s was a High Threat Zone. From 1950-1959, there were 64 total Militarized Interstate Disputes (MIDs) in East Asia and 37 high-level MIDs that included the occupation of territory, attacks, clashes, and full-scale

interstate war. This trend continued in the 1960s as the total number of MIDs increased to 68, while the high-level MIDs decreased moderately to 27.[11]

The numbers clearly exceed the High Threat Zone criteria for each decade. Furthermore, the region remained a High Threat Zone during the 1970s with reduced, but still elevated total MIDs and a consistent level of high level MIDs. East Asia was a tough neighborhood in this period; we must now examine South Korea's dyadic relationships to fully understand the threat context of its weapons program.

Table 7: East Asian Threat Zone Characterization

Decade	All MIDs	Severe MIDs	Threat Zone
1950-1959	64	37	Red
1960-1969	68	27	Red
1970-1979	33	30	Red

Source: Author's Original Work, data derived from Correlates of War MIDA_4.01.csv dataset, Palmer, Glenn, Vito D'Orazio, Michael Kenwick, and Matthew Lane. 2015. http://www.correlatesofwar.org/data-sets/MIDs Accessed 3 April 2017.

It is not only a state's regional threat zone that drives its threat perception, but also the quality of its dyadic relationships. Two forms of dyadic rivalry are particularly relevant to a state's security calculations: protracted conflict and enduring rivalries. In Chapter 3, I defined protracted conflict as a long-standing, intense conflict often over highly emotional issues in which the dyadic pair are engaged in a MID for more than 500 days in a ten-year period. An enduring rivalry is similar, but defined by frequency of dispute rather than duration. I define an enduring rivalry as a dyadic pair that has engaged in more than 5 MIDs in a ten-year period. South Korea in the 1960s was embroiled in both types of contentious dyads.

[11] Data derived from Correlates of War MIDA_4.01.csv dataset, Palmer, Glenn, Vito D'Orazio, Michael Kenwick, and Matthew Lane. 2015. http://www.correlatesofwar.org/data-sets/MIDs Accessed 3 April 2017.

Somewhat surprisingly to those unfamiliar with Korean history, South Korea's enduring rivalry in this period was with Japan. During the 1960s, Japan and South Korea were involved in seven MIDs, although they were all instigated by South Korea and none were fatal.

More obviously, South Korea engaged in a protracted conflict with North Korea (DPRK). As an extension of the unresolved Korea War, the pair was engaged in a MID for 5,255 days during the decade.[12] To add qualitative richness to this objective measure, the DPRK was significantly outspending the ROK on defense during the period and conducted severely brazen provocations including the attempted assignation of President Park in a commando raid, the seizure of the *USS Pueblo*, and the shoot-down of an American EC-121 reconnaissance plane.[13] It is clear that before the initiation of their nuclear weapons program, South Korea was experiencing a high sense of threat. But were these dyadic threats consistent throughout the life of the program?

During the 1970s, South Korea continued to experience contentious dyadic relationships. Although the ROK-Japanese relationship no longer met the requirements for an enduring rivalry, the relationship between North and South Korea met the definition of both an enduring rivalry and protracted conflict. In this period, South Korea and North Korea engaged in 5 MIDs totaling 1,447 days in length, well-exceeding the 500 day/decade standard.

Based on the scoring typology established in Chapter 3, South Korea overwhelming scores a "3" for the highest Threat term for both the decade leading up to its nuclear weapons program and during the decade for its existence. Continuity in this independent variable of threat therefore does not explain the observed change in the proliferation

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[12] Data derived from Correlates of War MIDA_4.01.csv dataset, Palmer, Glenn, Vito D'Orazio, Michael Kenwick, and Matthew Lane. 2015. http://www.correlatesofwar.org/data-sets/MIDs Accessed 3 April 2017.
[13] Reiss and Pollack, "South Korea," 261.

movement dependent variable. It is then necessary to examine our other independent variable, perceived commitment.

Table 5: Perceived Threat Environment, T_p, Scoring Typology

Perceived Threat Environment	Threat Score
Low External Threat Zone	1
Moderate Threat Zone	2
High Threat Zone or Protracted Conflict (>500 days MID) or Enduring Rivalry (>5 MIDs)	3

Source: Author's Original Work

As the threat independent variable is indeterminate in explaining South Korea's nuclear proliferation, we must look to the perceived commitment variable. Based on the Allied Proliferation Vector model, $f(P) = T - C_p$ (Proliferation = Threat – perceived Commitment) there should only be forward proliferation movement when the Threat outweighs the perceived commitment. Given an established threat level of "3", we should expect that the perceived commitment level would be "2" or lower to generate change along the dependent variable.

Table 6: Perceived Commitment, Cp, Scoring Typology

US-Ally Relationship	Perceived Commitment Score
Responsible Actor	1
Treaty Ally or MNNA	2
Ally with US troop deployment	3

Source: Author's Original Work

From a strictly objective basis, South Korea should have been unlikely to pursue nuclear weapons because there technically were US troops deployed in South Korea for the entirety of the period leading up to, during, and at the cessation of their nuclear weapons program. This observation is misleading, though, because what is important, was not the current state of US deployments, but the ROK expectation of future US force posture and commitment. The United States undermined its

credibility to maintain its commitment to South Korea by its rhetoric and actions on the peninsula and throughout the region.

The Nixon administration announcement of a plan reducing US Forces in Korea (USFK) following the Guam Doctrine in 1969 rocked the US-Korean alliance. In August 1970, US Vice President Spiro Agnew presented a timetable to South Korea as the first stage of a complete withdrawal over five years. [14] Despite vehement ROK objections, the United States reconfirmed this timetable in Feb 1971and by March the US 7th Infantry Division and three USAF squadrons had withdrawn from the peninsula.[15] The US also accompanied the reduction of 24,000 troops with a repositioning of the US 2nd Infantry Division away from the Demilitarized Zone.

These actions only added to ROK uncertainty as "many South Koreans interpreted this as a loss of U.S. automatic engagement in the event of a North Korean invasion."[16] Thus, the South Korean government could reasonably perceive that the future level of US commitment would decrease to defense treaty on paper, but without any tangible commitments. As a result, this degree of commitment in the Allied Proliferation Model only scores a "2", placing the threat to commitment level dangerously out of balance. Even worse, broader US actions in the region raised a specter of doubt that the United States might abandon South Korea completely.

US foreign policy regarding Taiwan and Vietnam further exacerbated South Korean doubt in the credibility of US commitments. Mark Fitzpatrick writes, "Nixon's rapprochement with China and downgrading of relations with the Republic of China (ROC, or Taiwan) in 1971-72 further undermined South Korea trust, especially given the

[14] Choi and Park, "South Korea: Fears of Abandonment and Entrapment," 376.
[15] Republic of Korea, Institute for Military History, *The History of the ROK-US Alliance, 1953-2013,* 131.
[16] Choi and Park, "South Korea: Fears of Abandonment and Entrapment," 376.

parallels between the ROK and the ROC. South Koreans worried that Washington might begin a dialogue with Pyongyang behind Seoul's back or accept Beijing's demand that all US troops be withdrawn from the Korean peninsula."[17] In an echo of what was happening in Korea, US diplomatic desertion of Taiwan also corresponded with a withdrawal of US forces from the island. South Korean doubts of US credibility were further weakened by the rapidly declining situation in South Vietnam.

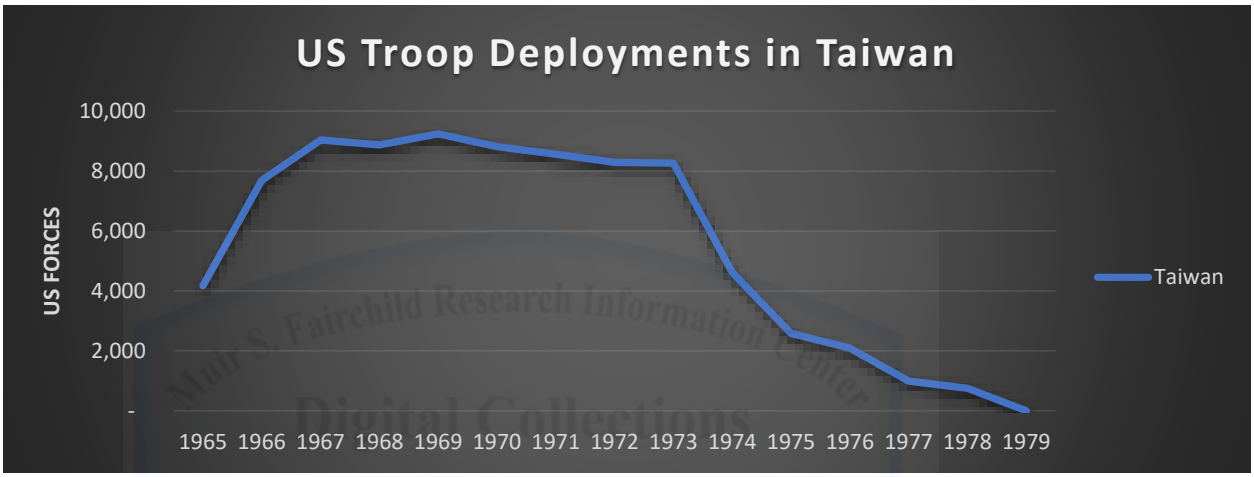

Figure 2: US Troop Deployments in Taiwan 1965-1979
Source: Author's Original Work, data derived from Tim Kane, "Global U.S. Troop Deployment, 1950-2005," The Heritage Foundation, accessed January 16, 2017, http://www.heritage.org/research/reports/2006/05/global-us-troop-deployment-1950-2005.

US abandonment of the South Vietnamese government represented an even greater blow to US credibility. The withdrawal of US troops from Vietnam in 1973 and the subsequent failure of the United States to prevent the fall of Saigon in 1975 certainly cast doubt on the credibility of US security commitments on the Korean peninsula once US troops were removed. In this context, the South Korean perception of US commitment may have reached as low a "1" on the Allied Proliferation Vector Model. Without the assurance of US troops on the peninsula the South Koreans could not be certain that the United States would uphold

[17] Fitzpatrick, *Asia's Latent Nuclear Powers,* 19.

its security guarantees. It is then not unreasonable that Seoul would have looked to nuclear weapons to offset this looming loss of US support.

It was only under the threat of immediate US rejection and the promise of delayed troop withdrawl that Park Chung-hee suspended the South Korea nuclear program in 1975. US Ambassador to South Korea Richard Sneider warned darkly, "If the ROKG proceeds as it has indicated to date, [the] whole range of security and political relationships between the U.S. and ROK will be affected."[18] The United States also pressured France and Canada to cancel their nuclear reactor contracts with Seoul. In a concession to Seoul's concerns, US Secretary of Defense James Schlesinger promised in 1974 to delay complete withdrawal another five years while the ROK military could modernize its conventional forces.[19] The prospect of losing the US nuclear umbrella before the South Koreans could develop an indigenous capability compelled Park to accede to US demands. In 1975, he ordered the termination of the nuclear weapons program and South Korea ratified the Nuclear Non-Proliferation Treaty (NPT) which it had reluctantly signed in 1968.[20]

[18] Reiss and Pollack, "South Korea," 263.
[19] Republic of Korea, Institute for Military History, *The History of the ROK-US Alliance, 1953-2013*, 132.
[20] Mark Fitzpatrick, *Asia's Latent Nuclear Powers: Japan, South Korea and Taiwan*, Adelphi 455 (London: Milton Park, Abingdon: International Institute for Strategic Studies; Routledge, 2016), 20.

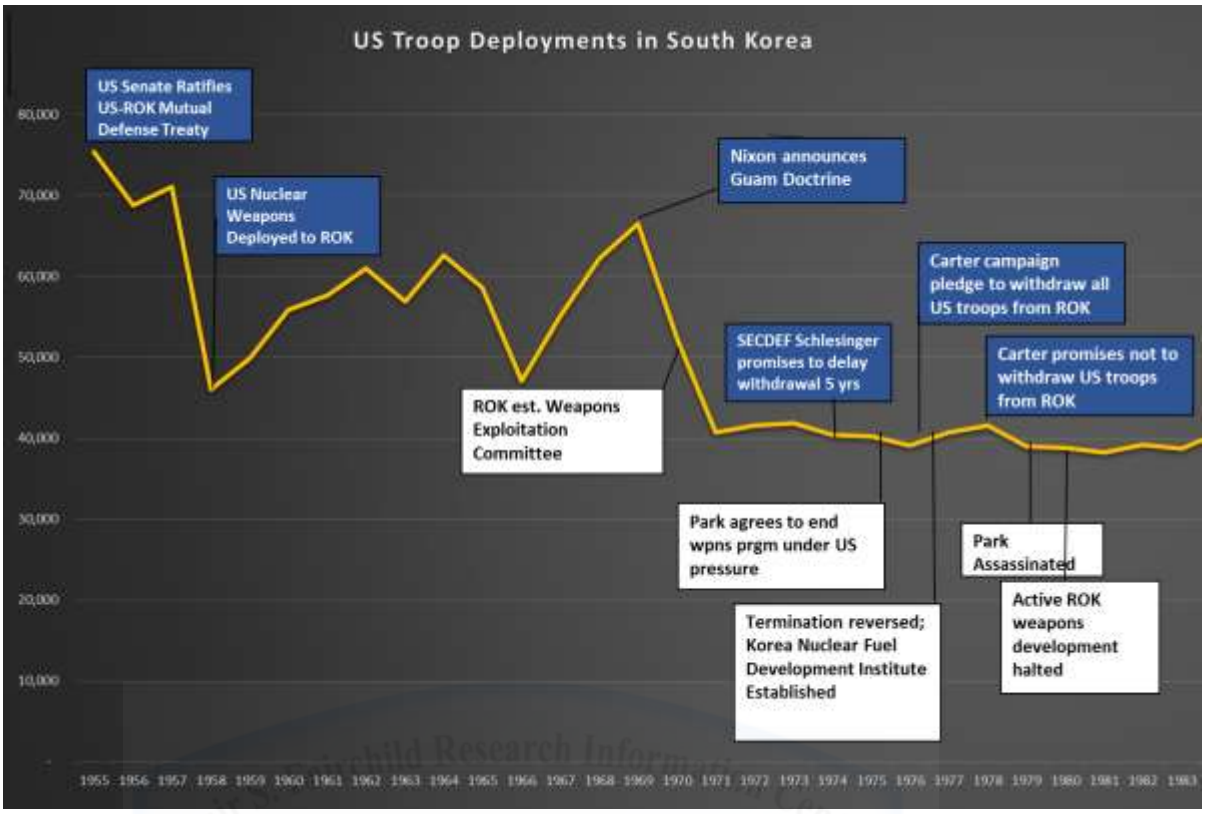

Figure 3: Timeline of US and ROK Actions Plotted against US Troop Levels in South Korea
Source: Author's Original Work, troop level data derived from Kane, "Global U.S. Troop Deployment, 1950-2005."

Upon further examination, it is doubtful whether Park ever truly abandoned his nuclear ambition. Kang Choi and Joon-Sung Park argue that rather than complete termination, "a nuclear 'hide-and-seek' game unfolded between Seoul and Washington," in which "most South Korea nuclear programs were simply renamed and reorganized."[21] Regardless, South Korea's slowing of forward proliferation momentum was only temporary and was highly sensitive to US domestic politics. Throughout the 1976 US presidential campaign, candidate Jimmy Carter had coupled human rights criticism of the Park regime with a pledge to completely withdraw US troops from the Korean peninsula. When Carter

[21] Choi and Park, "South Korea: Fears of Abandonment and Entrapment," 377.

won the election, Park sensed an impending loss of US commitment and restarted the secret nuclear program.

The illicit South Korea nuclear program ended in 1979 due to a confluence of several events. A combination of sticks and carrots from the US incentivized South Korean cooperation and a change in ROK leadership provided the political opportunity for a policy change. The US threatened to cancel a $300 million loan for a civilian nuclear reactor unless the ROK stopped suspicious research activities.[22] The Carter administration also terminated its withdrawal plan and established an integrated command and control structure with the ROK military, the Combined Forces Command, which assuaged South Korean insecurity.[23]

The assassination of the South Korean dictator Park in 1979 ultimately ended the ROK weapons program. His successor Chun Doo Hwan, in need of national legitimacy and US support, ended South Korea's suspect nuclear activity and committed the country to civilian nuclear development.[24] The election of Ronald Reagan in 1980 on a hardline anti-communist platform cemented the US commitment as the new US administration "provided a reinvigorated security guarantee while maintaining the threat of sanctions"[25] It is clear from this timeline that perceptions of US commitment affected the South Korean nuclear weapons program.

South Korea's flirtation with nuclear weapons represented a clear example of the consequences of a mismatch between a severe threat environment and wavering allied commitment. While South Korea's threat environment remained at a "3" throughout the period, their perception of US commitment dropped to a "2" by 1970 and perhaps even lower by the mid-70s. This imbalance explains the forward

[22] Reiss and Pollack, "South Korea," 263.
[23] Choi and Park, "South Korea: Fears of Abandonment and Entrapment," 377-378
[24] Snyder, "South Korean Nuclear Decisionmaking," 162.
[25] Fitzpatrick, *Asia's Latent Nuclear Powers*, 21.

proliferation vector South Korea underwent during this period. When the US solidified its commitment through the guarantee of an American troop presence on the Korean peninsula, it restored the balance between the threat environment and Seoul's perception of its ally's commitment. Only then did South Korea's forward proliferation vector cease. We can learn important lessons from this case about the unintended consequences of American retrenchment.

Chapter 5

Conclusion:

Be Careful What You Ask For...

Nobody likes a mooch and "free-riders" are the worst. From National Public Radio pledge drives to office snack bars to mutual defense treaties there is always someone willing to take advantage of a collective good without pulling their weight. It is therefore understandable that then-candidate Donald Trump might condition fulfillment of US collective defense agreements on whether allies had "fulfilled their obligations to us."[1] A little uncertainty in a great power-ally relationship is not always a terrible thing; it can keep the dependent state from taking the great power for granted.

Yet, too much uncertainty can lead an ally to hedge against great power abandonment. This hedging can come in the form of external balancing as evidenced by the Philippines' strategic pivot toward China. It can also come in the form of internal balancing in which allies increase their military mobilization and defense expenditures to guard against great power desertion. The most radical form of internal balancing is the acquisition of nuclear weapons. How can the United States encourage its allies to share more of the collective defense burden, while discouraging them from pursuing nuclear weapons? To find an answer, this study sought to understand the causes of nuclear weapons proliferation.

This project begins with an examination of plausible explanations to help answer the question above. Some analysts have proposed that technological and economic factors best explain patterns of proliferation. These studies presume that the opportunity for a weapon drives the desire to build one. Yet, numerous states possess the financial resources and scientific capabilities to develop nuclear weapons, but have not done

[1] David E. Sanger and Maggie Haberman, "Donald Trump Sets Conditions for Defending NATO Allies Against Attack," *The New York Times*, July 20, 2016, https://www.nytimes.com/2016/07/21/us/politics/donald-trump-issues.html.

so. Constructivists and liberal institutionalists argue that changed norms about the appropriateness of nuclear weapons and the constraining influence of the Nuclear Nonproliferation Treaty (NPT) have consigned the pursuit of nuclear weapons to pariah states. Yet, nonproliferation norms are strongest among states who need nuclear weapons the least; when states facing severe security imperatives have felt they needed nuclear weapons they have withdrawn from (North Korea), cheated (Iraq, Syria, Iran), or just ignored (India, Pakistan, Israel) the NPT.

The lack of plausible alternative theories leaves the traditional realist answer for why states pursue nuclear weapons. States acquire nuclear weapons for security. When facing a security threat a state can bolster its conventional military forces or search for a great power ally. If these options are unavailable or insufficient, the state will turn to the ultimate deterrent, nuclear weapons. Recent multivariate statistical studies have borne out this conventional wisdom by showing that security variables have the greatest relative weight in determining the probability of nuclear proliferation.[2] To understand, then, what would cause a US ally to pursue nuclear weapons requires seeing the security environment and US actions from the ally's perspective. The need for this analytical perspective led to the development of a model that could assess this viewpoint.

The Allied Proliferation Vector Model postulates that forward proliferation movement by an ally occurs when the perceived defense commitment of its great power protector is insufficient for the ally's threat environment. I measure the threateningness of the security environment in terms of numbers of conflicts within an ally's region as well as the frequency and the duration of conflicts that ally has with

[2] Sonali Singh and Christopher R. Way, "The Correlates of Nuclear Proliferation"; Jo and Gartzke, "Determinants of Nuclear Weapons Proliferation"; Bleek, "Why Do States Proliferate? Quantitative Analysis of the Exploration, Pursuit, and Acquisition of Nuclear Weapons"; Bleek and Lorber, "Security Guarantees and Allied Nuclear Proliferation."

other dyadic pairs. I measure the level of great power commitment in terms of formal alliance treaties and permanence of military deployment. According to this model, an ally in a highly threatening security environment would require a substantial demonstration of great power commitment to forestall the pursuit of nuclear weapons. I use a South Korean case study to test the model for its explanatory abilities.

Conclusions

The case of South Korea's exploration of nuclear weapons in the 1970s is an excellent example of the Allied Proliferation Vector model in operation and yields two key conclusions. First, when the balance between a state's threat environment and the commitment of its great power protector is out of alignment, it will likely lead to forward proliferation movement. In the 1960s and 70s, South Korea faced a severe threat environment. East Asia was region rife with militarized conflict. South Korea, itself, had a historical enduring rivalry with Japan, occasional disputes with China, and an existential conflict with North Korea over the rightful government of the Korean people. When the Nixon administration attempted to shift its defense burden through a partial troop withdrawal, South Korea's leaders interpreted this action as a sign of wavering security commitment and a prelude to an absolute US retreat from the peninsula. This perception fueled the Park regime's exploration of nuclear weapons. A mismatch between the threat environment and the level of expected US commitment drove nuclear proliferation momentum.

The story of South Korea's nuclear program yields another conclusion: nuclear proliferation is reversible…to a point. It took a decade and three US presidential administrations to shore up ROK faith in US security commitments, but by the mid-1980s, South Korea had largely abandoned its nuclear weapons program. By the 1990s, South Korea had joined an agreement to denuclearize the peninsula, even at the cost of US nuclear weapons deployments. Yet, as Rebecca Hersman

and Robert Peters argue, with South Korea's robust commercial nuclear industry combined with its large scientific workforce, "should Seoul reconsider its nuclear weapons future it could probably restart a program fairly quickly."[3] Thus, the proliferation vector can be reversed, but probably not to zero. Some things cannot be unlearned. From this episode, we can draw important implications and make informed recommendations.

Implications

There are several important implications we can glean from this study of South Korea's aborted nuclear weapons attempt. The first is that the fear of abandonment can function the same as actual abandonment. The US never deserted its South Korean ally, but US actions and rhetoric indicated to the South Koreans that it might. Throughout the course of the ROK nuclear weapons program, the US always had tens of thousands of troops deployed in South Korea. Moreover, neither Nixon's Guam Doctrine nor Carter's troop withdrawal pledge explicitly called for the abnegation of the ROK-US Mutual Defense Treaty. Yet, despite these objective facts the South Korean perception was different. Given the severity of the threat the South Koreans faced and the poor state of their conventional forces, the Seoul could not risk the possibility that the US might abandon it. Therefore, it is reasonable that they would look to the ultimate weapon to compensate for what appeared to be a highly probably deficiency in US support.

A second implication we can draw from the US-ROK relationship is that rhetoric aimed at one audience can resound with other strategic actors in unexpected ways. President Nixon's comments on Guam in 1969 are a good example of this lesson. Historian Jeffrey Kimball argues that Nixon did not intend these comments to convey a new "doctrine" or

[3] Hersman and Peters, "Nuclear U-Turns," 542.

strategic reorientation. Kimball argues that Nixon "wanted not to make policy but to project an image of a foreign-policy leader who was experienced, comprehensive in his thinking, and far sighted."[4] Moreover, though he was cognizant that other allies might react to his comments, Nixon's focus was not on South Korea. According to Kimball, "in July 1969 Nixon was still stuck in Vietnam."[5] While Nixon may have been talking to Saigon, his words resonated in Seoul with a thunder that shook South Korean confidence.

Another example of the far reach of US political rhetoric is presidential candidate Carter's pledge during the 1976 campaign to withdrawal all US troops from Korea. This pledge was aimed primarily at a US domestic audience that was weary of foreign entanglements after years mired in the strategic morass of Vietnam. Furthermore, Carter at least partially intended his human rights criticism of the Park regime as a fillip to the progressive base of the Democratic party. His domestic political rhetoric unintentionally undermined ROK trust in US commitments and gave Park the incentive to reenergize the illicit nuclear weapons program which the Nixon/Ford administrations had worked so hard to roll back.

A further implication that flows from this research is that if the US demands that its allies shoulder more of their own security, they may actually do so, but in ways that are detrimental to US counterproliferation interests. Unintended blowback from "America First" rhetoric could include, as the South Korean case shows, renewed nuclear proliferation by US allies. US policy has long discouraged nuclear proliferation for a variety of moral, legal, stability, and American primacy reasons. US extended deterrence undergirds this policy by obviating the need for American allies to field their own nuclear weapons. If the United

[4] Jeffrey Kimball, "The Nixon Doctrine: A Saga of Misunderstanding," *Presidential Studies Quarterly* 36, no. 1 (March 2006): 65.
[5] Jeffrey Kimball, "The Nixon Doctrine: A Saga of Misunderstanding," 65.

States appears, through statements, actions, or tweets, to be unwilling to defend its allies then it is reasonable that they may turn to nuclear self-help.

Public discussion has increased within South Korea, Saudi Arabia, and even the European Union[6] about whether these entities should acquire their own nuclear weapons. Although a nuclear proliferation strategy is currently a fringe idea for most US allies, a significant retrenchment in US security commitments could make these ideas viable, particularly for states facing highly acute threats. As the Allied Proliferation Vector Model prescribes, the United States must keep the perception of its security commitment commensurate to its allies' threat environment, if it wants to prevent forward proliferation movement.

Recommendations

There are several specific policies that the United States can adopt to counter the potential for allied nuclear proliferation. I make these recommendations in order to reinforce allied perceptions of US commitment as well as moderate the security environment facing our allies.

Recommendation 1: Double Down on Security Commitments

First, the Trump administration can rhetorically affirm the sanctity of US security commitments in Asia, Europe, and the Middle East and reject isolationist voices calling for an American retreat from global

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[6] Anna Fifield, "As North Korea Flexes Its Muscles, Some in South Want Nukes, Too," *Washington Post*, accessed April 18, 2017, https://www.washingtonpost.com/world/asia_pacific/as-north-korea-flexes-its-muscles-the-other-korea-looks-at-nukes-too/2016/03/20/e2b1bb22-eb88-11e5-a9ce-681055c7a05f_story.html; Yaroslav Trofimov, "Saudi Arabia Considers Nuclear Weapons to Offset Iran," *Wall Street Journal*, May 7, 2015, sec. World, http://www.wsj.com/articles/saudi-arabia-considers-nuclear-weapons-to-offset-iran-1430999409; Max Fisher, "Fearing U.S. Withdrawal, Europe Considers Its Own Nuclear Deterrent," *The New York Times*, March 6, 2017, https://www.nytimes.com/2017/03/06/world/europe/european-union-nuclear-weapons.html.

leadership. It is misleading to suggest that the United States is "cheated" when its allies do not fund their militaries to agreed-upon levels. The US military does not depend on any ally's contribution for its own defense; all allied capabilities are supplementary. Often the most significant role of US allies is political and symbolic rather than tactical employment. Even if all NATO allies spent more than the required 2% of GDP on defense, their greatest contribution to US operations would be legitimacy, not line formations.

Furthermore, allied reliance on US military primacy amplifies the United States' general influence, to America's benefit. Robert Art writes that while the actual use of force is like a "powerful flood", latent military power is "akin to a gravitational field among large objects in space: it affects all motion that takes place, but it produces its effects imperceptibly."[7] While the effect of America's latent military power may not be able to be measured, it is assuredly real and shapes the United States' interaction with all other states, even its allies. The United States gains greater leverage the greater the disparity is between US and allied military capabilities and the more dependent allies are on US security guarantees. When allies are less dependent on US power, they are freer to act in ways that are contrary to US interests.

This was the case of the Park regime which went "rogue" regarding nuclear weapons when it believed that it may not be able to depend on the United States. Today, because of its relative military predominance and the depth of allied dependence, the United States gets what it wants most of the time. That is a pretty good deal; the Trump administration should refrain from talking as if it is a bad one.

Recommendation 2: Baltic Trip Wire

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[7] Robert J. Art, "The Fungibility of Force", *The Use of Force: Military Power and International Politics*, ed, Robert J. Art and Kenneth N. Waltz, 7th ed. (Lanham, MD: Rowman & Littlefield Publishers, 2009), 3.

Second, United States European Command or NATO should establish a permanent joint base in the Baltics or Poland. The security environment in Eastern Europe has worsened with recent Russian actions in Georgia and Ukraine. To prevent the temptation of nuclear weapons, the United States must increase its level of commitment accordingly. While the Baltic air policing mission and the rotating US Army brigade in Poland are positive steps, they may not be enough. Those missions involve temporary forces that do not communicate the alliance solidarity of a permanent garrison, especially one with accompanied dependents.

A permanent military base in Eastern Europe would not only act as an assurance to eastern NATO allies, but would also be a deterrent to Russian adventurism. As the situation stands today, Russian forces could rapidly overrun a Baltic country's defenses. More deniably, it could use maskarovka forces to stage a separatist uprising in a heavily ethnic Russian border region such as Narva in Estonia or Latgale in Latvia.[8] When Russian "peacekeeping" forces entered to protect the rights of their ethnic kindred they could present the United States and NATO with an irredentist fait accompli that would likely split the alliance over how to respond. What could permanent military forces stationed in the region do to stop this scenario?

To quote Thomas Schelling again, "Bluntly, they can die. They can die heroically, dramatically, and in a manner that guarantees that the action cannot stop there."[9] The presence of US and NATO forces signals to Russia the potential for escalation and a commitment which the US cannot renege on. A permanent presence signals to the eastern NATO allies that this commitment is long-standing. As inconceivable as it may

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[8] Andrew Higgins, "Latvian Region Has Distinct Identity, and Allure for Russia," *The New York Times*, May 20, 2015, https://www.nytimes.com/2015/05/21/world/europe/latvian-region-has-distinct-identity-and-allure-for-russia.html.
[9] Schelling, *Arms and Influence*, 47.

seem, in the absence of such an assurance it would be reasonable for these eastern allies to follow in the proliferation footsteps that South Korea explored forty years before. Just as the establishment of the Combined Forces Command in South Korea was a demonstrably sign of the durability of US presence, so would a permanent US or NATO base signal the firmness of the alliance's commitment to its most vulnerable members.

Recommendation 3: A Competition in Risk Taking

A final recommendation is that the United States should consider the redeployment of non-strategic nuclear weapons (NSNWs) to Eastern Europe. The United States has long had NSNWs deployed in Europe. Throughout the Cold War, the United States deployed these weapons at the eastern edge of the NATO alliance as a hedge against Soviet "salami slice" tactics in which the USSR might hope to gain advantage through aggression that fell below the level of massive nuclear retaliation. Damon Coletta writes that US leaders intended these weapons to provide "a seamless fabric of response options" in which NATO "could credibly cross the nuclear threshold without ending the world."[10] Although NATO no longer faces conventionally superior Russian land forces, the alliance continues to have an asymmetry of interests in how and whether to respond to Russian "salami slicing." Now instead of the frontline falling in Berlin, it is Riga, Tallinn, and Vilnius who fear abandonment

Although these NSNWs are often referred to as "tactical nukes", their deployment to Eastern Europe would not be intended for nuclear warfighting. Their purpose would be entirely political; they would raise the potential for escalation and therefore increase the credibility of US extended deterrence. By creating the possibility that a conventional

[10] Damon V. Coletta, "Deterrence Logic and NATO's Nuclear Posture," *Strategic Studies* 69 (2013), 76.

attack could inadvertently strike US nuclear weapons, the United States would make it more difficult for an adversary to keep local aggression limited. The potential for inadvertent escalation that NSNWs pose is what Schelling called, "the threat that leaves something to chance."[11] This threat enhances the deterrence of Russian aggression against the Baltics.

Like permanent military bases, NSNWs provide assurance to allies as well as deterrence to adversaries. Through their presence, the United States would help mitigate the incentive for its allies to develop their own nuclear weapons. For both deterrence and assurance reasons, the United States should consider discussing the redeployment of NSNWs with its NATO partners. As the Allied Proliferation Vector model shows, an increase in the severity of the threat environment requires a commensurate increase in allies' perception of US commitment to avoid the temptation of nuclear proliferation.

Areas for Further Study

One weakness of this thesis is that I only tested the Allied Proliferation Vector model against a single case. To test the model more robustly, it would be useful to run it against a larger sample of both proliferation and non-proliferation cases. These tests could be done through qualitatively process tracing case studies as I did with South Korea. Interesting prospective cases could include Israel, Taiwan, South Africa, Argentina, or Japan. One could also take a large-n quantitative approach of coding the universe of both proliferation and restraint cases to see if the model explains actual state behavior.

Another area of further research would be to explore if the alliance dynamics between the United States and its allies is the same as for the Soviet Union/Russia and China and their allies. Have security commitments and the deployment of military forces had the same

[11] Schelling, *Arms and Influence,* 121n.

restraining effect on their allies' behavior? A significant difference between these alliance blocs could indicate the operation of an ideological factor in the alliance dynamic.

A final area of potentially fruitful research could be exploring the effect of deployed military forces on other aspects of bi-lateral relations. Just as military posture influences a state's nuclear proliferation motivations it may also have effects in other non-intuitive areas of foreign policy. It could be useful to explore whether the deployment of a great power ally's military in a state's territory affects that state's trade policy, human rights behavior, or willingness to join international organizations.

A World Order...If You Can Keep It

The United States is the leader and sustainer of the liberal international order because its allies trust US commitments and rely on American defensive guarantees rather than providing entirely for their own defense. When US allies begin to hedge against the United States it is a sign that they have lost faith in the credibility of American commitments. The exploration or pursuit of nuclear weapons by an ally sends a clear signal that ally has lost confidence in its great power protector. If the United States wants to avoid this situation it must match its rhetoric and force posture to the security environment facing its allies.

Bibliography

"22 CFR 120.32 - Major Non-NATO Ally." *LII / Legal Information Institute*. Accessed January 31, 2017. https://www.law.cornell.edu/cfr/text/22/120.32.

Abraham, Itty. *The Making of the Indian Atomic Bomb: Science, Secrecy and the Postcolonial State*. Zed Books, 1998.

Alagappa, Muthiah, ed. *The Long Shadow: Nuclear Weapons and Security in 21st Century Asia*. Stanford, Calif: Stanford University Press, 2008.

Allison, Graham T., and Philip Zelikow. *Essence of Decision: Explaining the Cuban Missile Crisis*. 2nd ed. New York: Longman, 1999.

Art, Robert J., and Kenneth N. Waltz, eds. *The Use of Force: Military Power and International Politics*. 7th ed. Lanham, Md: Rowman & Littlefield Publishers, 2009.

Bleek, Philipp. "Why Do States Proliferate? Quantitative Analysis of the Exploration, Pursuit, and Acquisition of Nuclear Weapons." In *Forecasting Nuclear Proliferation in the 21st Century: The Role of Theory*, edited by William C. Potter and Gaukhar Mukhatzhanova, Vol. 1. Palo Alto: Stanford Security Studies/Stanford University Press, 2010.

Bleek, Philipp, and Eric Lorber. "Security Guarantees and Allied Nuclear Proliferation." In *Nonproliferation Policy and Nuclear Posture: Causes and Consequences for the Spread of Nuclear Weapons*, edited by Neil Narang, Erik Gartzke, and Matthew Kroenig, 69–93. Routledge, 2015.

Campbell, Kurt M., Robert J. Einhorn, and Mitchell Reiss, eds. *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices*. Washington, D.C: Brookings Institution Press, 2004.

Choi, Kang, and Joon-Sung Park. "South Korea: Fears of Abandonment and Entrapment." In *The Long Shadow: Nuclear Weapons and Security in 21st Century Asia*, edited by Muthiah Alagappa. Stanford, Calif: Stanford University Press, 2008.

Coletta, Damon V. "Deterrence Logic and NATO's Nuclear Posture." *Strategic Studies* 69 (2013).

Diehl, Paul F., and Gary Goertz. *War and Peace in International Rivalry*. University of Michigan Press, 2001.

Fifield, Anna. "As North Korea Flexes Its Muscles, Some in South Want Nukes, Too." *Washington Post*. Accessed April 18, 2017. https://www.washingtonpost.com/world/asia_pacific/as-north-korea-flexes-its-muscles-the-other-korea-looks-at-nukes-too/2016/03/20/e2b1bb22-eb88-11e5-a9ce-681055c7a05f_story.html.

Fisher, Max. "Fearing U.S. Withdrawal, Europe Considers Its Own Nuclear Deterrent." *The New York Times*, March 6, 2017.

https://www.nytimes.com/2017/03/06/world/europe/european-union-nuclear-weapons.html.
Fitzpatrick, Mark. *Asia's Latent Nuclear Powers: Japan, South Korea and Taiwan*. Adelphi 455. London: Routledge for International Institute for Strategic Studies, 2016.
Fuhrmann, Matthew. "Spreading Temptation: Proliferation and Peaceful Nuclear Cooperation Agreements." *International Security* 34, no. 1 (2009): 7–41.
———. "Taking a Walk on the Supply Side: The Determinants of Civilian Nuclear Cooperation." *The Journal of Conflict Resolution* 53, no. 2 (2009): 181–208.
Gartzke, Erik, Jeffrey M. Kaplow, and Rupal N. Mehta. "The Determinants of Nuclear Force Structure." *Journal of Conflict Resolution* 58, no. 3 (2014): 481–508.
Gartzke, Erik, and Matthew Kroenig. "A Strategic Approach to Nuclear Proliferation." *The Journal of Conflict Resolution* 53, no. 2 (2009): 151–160.
———. "Nuclear Posture, Nonproliferation Policy, and the Spread of Nuclear Weapons." *Journal of Conflict Resolution*, 2013, 22002713509056.
Hersman, Rebecca K. C., and Robert Peters. "Nuclear U-Turns: Learning from South Korean and Taiwanese Rollback." *The Nonproliferation Review* 13, no. 3 (November 2006): 539–53. doi:10.1080/10736700601071629.
Higgins, Andrew. "Latvian Region Has Distinct Identity, and Allure for Russia." *The New York Times*, May 20, 2015. https://www.nytimes.com/2015/05/21/world/europe/latvian-region-has-distinct-identity-and-allure-for-russia.html.
Horowitz, Michael C., and Neil Narang. "Poor Man's Atomic Bomb? Exploring the Relationship between 'weapons of Mass Destruction.'" *Journal of Conflict Resolution*, 2013, 22002713509049.
Hymans, Jacques. "Assessing North Korean Nuclear Intentions and Capacities: A New Approach." *Journal of East Asian Studies* 8, no. 2 (2008): 259–292,340.
———. "The Threat of Nuclear Proliferation: Perception and Reality." *Ethics & International Affairs* 27, no. 3 (2013): 281–298. doi:10.1017/S089267941300021X.
Hymans, Jacques E. C. *Achieving Nuclear Ambitions: Scientists, Politicians, and Proliferation*. Cambridge University Press, 2012.
———. *The Psychology of Nuclear Proliferation: Identity, Emotions and Foreign Policy*. Cambridge, UK ; New York: Cambridge University Press, 2006.
Ikenberry, G. John. *Liberal Leviathan: The Origins, Crisis, and Transformation of the American World Order*. Reprint edition. Princeton University Press, 2012.
Jo, Dong-Joon, and Erik Gartzke. "Determinants of Nuclear Weapons Proliferation." *The Journal of Conflict Resolution* 51, no. 1 (2007): 167–194.

Kane, Tim. “Global U.S. Troop Deployment, 1950-2005.” *The Heritage Foundation*. Accessed January 16, 2017. http://www.heritage.org/research/reports/2006/05/global-us-troop-deployment-1950-2005.

Kemp, R. Scott. “The Nonproliferation Emperor Has No Clothes: The Gas Centrifuge, Supply-Side Controls, and the Future of Nuclear Proliferation.” *International Security* 38, no. 4 (2014): 39.

Kimball, Jeffrey. “The Nixon Doctrine: A Saga of Misunderstanding.” *Presidential Studies Quarterly* 36, no. 1 (March 2006): 59–74.

Kroenig, Matthew. “Exporting the Bomb: Why States Provide Sensitive Nuclear Assistance.” *The American Political Science Review* 103, no. 1 (2009): 113–133.

———. “Importing the Bomb: Sensitive Nuclear Assistance and Nuclear Proliferation.” *The Journal of Conflict Resolution* 53, no. 2 (2009): 161–180.

Lavoy, Peter R. “Nuclear Proliferation Over the Next Decade: Causes, Warning Signs, and Policy Responses.” *Nonproliferation Review* 13 (November 2006).

MacKenzie, Donald A. *Inventing Accuracy: A Historical Sociology of Nuclear Missile Guidance*. 4. pr. Cambridge, Mass.: MIT Press, 2001.

Monteiro, Nuno, and Alexandre Debs. “The Strategic Logic of Nuclear Proliferation.” *International Security* 39, no. 2 (2014): 7.

Mueller, Harald, and Andreas Schmidt. “The Little-Known Story of Deproliferation: Why States Give Up Nuclear Weapons Activities.” In *Forecasting Nuclear Proliferation in the 21st Century: The Role of Theory*, edited by William C. Potter and Gaukhar Mukhatzhanova, Vol. 1. Palo Alto: Stanford Security Studies/Stanford University Press, 2010.

Narang, Neil, Erik Gartzke, and Matthew Kroenig, eds. *Nonproliferation Policy and Nuclear Posture: Causes and Consequences for the Spread of Nuclear Weapons*. New York: Routledge, 2015.

———. , eds., n.d.

Narang, Vipin. “Strategies of Nuclear Proliferation: How States Pursue the Bomb.” *International Security* 41, no. 3 (January 2017): 110–50. doi:10.1162/ISEC_a_00268.

Paul, T. V. *Power Versus Prudence: Why Nations Forgo Nuclear Weapons*. McGill-Queen’s Press - MQUP, 2000.

Pilat, Joseph F., and Nathan E. Busch. *Routledge Handbook of Nuclear Proliferation and Policy*. Routledge, 2015.

Plokhy, Serhii. *The Gates of Europe: A History of Ukraine*. 1st ed. New York: Basic Books, 2015.

Potter, William C., and Gaukhar Mukhatzhanova, eds. *Forecasting Nuclear Proliferation in the 21st Century: The Role of Theory*. Vol. 1. 2 vols. Stanford Security Studies/Stanford University Press, 2010.

Potter, William, and Gaukhar Mukhatzhanova, eds. *Forecasting Nuclear Proliferation in the 21st Century: A Comparative Perspective*. Vol. 2. 2 vols. Stanford, Calif: Stanford Security Studies, 2010.

Reiss, Mitchell, and Jonathan D. Pollack. "South Korea." In *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices*, edited by Kurt M. Campbell, Robert J. Einhorn, and Mitchell Reiss. Washington, D.C: Brookings Institution Press, 2004.

Reiter, Dan. "Security Commitments and Nuclear Proliferation." In *Nonproliferation Policy and Nuclear Posture: Causes and Consequences for the Spread of Nuclear Weapons*, edited by Neil Narang, Erik Gartzke, and Matthew Kroenig, 94–114. Routledge, 2015.

Republic of Korea, Institute for Military History, ed. *The History of the ROK-US Alliance, 1953-2013*. South Korea: Institute for Military History Compilation, Ministry of National Defense, 2014.

Robinson, Todd C. "What Do We Mean by Nuclear Proliferation?" *The Nonproliferation Review* 22, no. 1 (January 2, 2015): 53–70.

Rublee, Martha Rost. *Nonproliferation Norms: Why States Choose Nuclear Restraint*. University of Georgia Press, 2009.

Sagan, Scott. "Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb." *International Security* 21, no. 3 (1996): 54–86.

Sagan, Scott Douglas, and Kenneth N. Waltz. *The Spread of Nuclear Weapons: An Enduring Debate*. 3rd ed. New York: W.W. Norton & Co, 2013.

Sanger, David E., and Maggie Haberman. "Donald Trump Sets Conditions for Defending NATO Allies Against Attack." *The New York Times*, July 20, 2016. https://www.nytimes.com/2016/07/21/us/politics/donald-trump-issues.html.

Schelling, Thomas C. *Arms and Influence*. New Haven: Yale University Press, 1966.

Snyder, Scott. "South Korean Nuclear Decisionmaking." In *Forecasting Nuclear Proliferation in the 21st Century: A Comparative Perspective*, edited by William Potter and Gaukhar Mukhatzhanova, Vol. 2. Stanford, Calif: Stanford Security Studies, 2010.

Solingen, Etel. *Nuclear Logics: Contrasting Paths in East Asia and the Middle East*. Princeton University Press, 2009.

Sonali Singh, and Christopher R. Way. "The Correlates of Nuclear Proliferation: A Quantitative Test." *Journal of Conflict Resolution* 48, no. 6 (2004): 859–885.

Tannenwald, Nina. "The Nuclear Taboo: The United States and the Normative Basis of Nuclear Non-Use." *International Organization* 53, no. 3 (1999): 433–468.

Trofimov, Yaroslav. "Saudi Arabia Considers Nuclear Weapons to Offset Iran." *Wall Street Journal*, May 7, 2015, sec. World. http://www.wsj.com/articles/saudi-arabia-considers-nuclear-weapons-to-offset-iran-1430999409.

Walt, Stephen M. “Alliance Formation and the Balance of World Power.” *International Security* 9, no. 4 (1985): 3–43.
Walzer, Michael. *Just and Unjust Wars: A Moral Argument with Historical Illustrations*. 5 edition. New York: Basic Books, 2015.